FLAGSTAFF BICYCLE PLAN

FINAL REPORT OF
THE AD HOC BIKEWAYS COMMITTEE
FLAGSTAFF, ARIZONA

1991

Flagstaff Bicycle Plan

October 1991

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1.0 EXECUTIVE SUMMARY

In May of 1990, the Flagstaff City Council appointed an Ad Hoc Bikeways Committee to review and recommend revisions to the existing and proposed bicycle plans, programs, and facilities so as to upgrade, improve and expand the bicycle path system of Flagstaff. During the ten months the Bikeways Committee met, they reviewed a range of reports and literature, developed and analyzed a city-wide bicycle survey, conducted field counts and route assessments, and considered input from experts and citizens.

The plan, released in October 1991, covers a wide range of bicycle issues, including bicycle facility development, education, advocacy, enforcement, registration, funding and implementation. Additionally, several program areas were reviewed in detail for their impact on bicycle planning, including, downtown Flagstaff, Northern Arizona University, the Coconino National Forest and the Flagstaff Urban Trail System.

Efforts were made to consider the needs of various types of bicycle riders, including children, commuters and utility bicyclists, and recreational riders. The following summarizes the recommendations presented in the plan.

ORGANIZATION

- A Bicycle Coordinator should be designated for the City of Flagstaff. Duties should include implementation of the Flagstaff Bicycle Plan.

- Establish a permanent Bicycle Commission to continue addressing bicycle-related issues in Flagstaff.

BICYCLE FACILITIES

- The Bikeways System, which includes bike paths, bike lanes and shared routes, should be maintained and expanded so as to provide safe, convenient access to destinations throughout the City.

- The Bikeways System should provide continuity of routes throughout the City.

- Continue to allow bicycles on all City streets as a legitimate mode of transportation.

- Complete the Santa Fe Bike Path.

- Provide a continuous north-south bicycle facility through the downtown area. Provide adequate bicycle parking facilities and signage in the downtown area.

- All new construction or reconstruction of city roadways should address the impact on bicycle and pedestrian accessibility, and the impact on the city-wide bikeways network. Bicycle facilities should be included where appropriate, as per design guidelines and this plan.

- Coordinate bicycle planning with Northern Arizona University so as to provide an integrated system of on-campus and City routes.

- Develop and use a consistent city-wide system of signs, include named or numbered routes, and destination and distance information.

- Private development, as well as, public facilities should be required to provide bicycle parking facilities. Frame securing racks should be provided close to destination points.

- Bikeways should be maintained on a regular schedule so as to be kept clear of cinders, snow, debris, and vegetation. Surfaces should be maintained and repaired in an acceptable manner for safe use.

TRANSPORTATION

- Employers should be required to provide bicycle parking, and encouraged to provide showers and locker room facilities.

- Encourage programs to assist commuters with advice on routes, maintenance, clothing and effective riding techniques.

- Provide bicycle racks mounted on public buses to encourage multi-modal transportation.

RECREATION

- The Flagstaff Urban Trail System should be open and accessible for bicycle riding. Where conflicts arise between trail user groups, restriction of bicycle use should be seen as a last resort. A comprehensive trail management program should be developed to ensure safe, comfortable multi-user trail opportunities for FUTS.

- Coordinate bicycle planning efforts between the City of Flagstaff and the Coconino National Forest through the creation of a Bikeway/Trail Advisory Council.

- Recreational tourism, especially bicycling, should be promoted in City tourism campaigns. Major bicycle sporting events should be promoted or sponsored by the City.

ADVOCACY

- Bicycle commuting should be encouraged.

- The City should sponsor bike-to-work days and other special events.

- Brochures should be developed to include local laws and registration information, a map of routes and trails, events listing, safe riding and maintenance techniques, and a list of local bike shops and organizations.

EDUCATION

- A comprehensive bicycle education program should focus on the adult, as well as, child population. The program should include special events, bicycle registration, publications, traffic classes, and coordination with various groups such as schools, business groups, medical offices, and clubs.

- Offer bicycle safety classes as an alternative to fines for bicycle traffic violations.

- Bike safety and information packets should be distributed with each new bike sold.

- Programs should promote the benefits of helmet use.

ENFORCEMENT

- Continue and expand Flagstaff Police Department bike patrols if it proves effective.

- Maximum publicity should precede periods of enforcement. Warning tickets and verbal warnings should be the first step for most violations.

- Warnings should be given or mailed to parents of children under the age of 14.

- Penalties should not be assessed against Driver's Licenses for bicycle violations. Encourage state to include questions on bicycle regulations on Driver's License tests.

REGISTRATION

- Expand registration program. Add additional locations for registration. Use registration as an opportunity for adult education by distributing information on regulations.

- Continue one-time fee of $1.00. Consider increasing fee to $3 or $5.
  Use fees for bicycle-related expenditures.

IMPLEMENTATION

- Bikeway funding should continue through the City's General Fund. Additional local sources of funding should be sought.

- Grants and outside funding sources should be sought for facility and program development.

- Right-of-way projects, such as flood control and utility line projects, should be evaluated for inclusion of trail and bikeway opportunities.

- All proposed City bond projects and Heritage Fund applications should be evaluated for inclusion of bikeway objectives.

2.0 INTRODUCTION

2.1 AD HOC BIKEWAYS COMMITTEE

On May 15, 1990, the Flagstaff City Council adopted resolution No. 1667, creating an Ad Hoc Committee to review and recommend revisions to existing and proposed plans, programs, and facilities so as to upgrade, improve and expand the bicycle path system of Flagstaff.

The resolution directed the Ad Hoc Committee to study the following criteria concerning bicycles in Flagstaff:

A. Physical data, inventory needs and assessments for Bikeways;

B. Bicycle user data characteristics;

C. Bicycle path development and program funding;

D. Bicycle education, publicity and advocacy programs;

E. Update the bikeway sub-element of Growth Management Guide 2000;

F. Evaluate related plans and programs for coordination with Bikeways objectives and implementation.

The Bikeways Committee met every other week, from July 1990 to May 1991, to consider the issues. In addition, committee members spent considerable time in the field engaged in route assessments, traffic counts, and gathering information from experts and citizens. The Bikeways Committee recommends that the City Council accept and implement this plan.

BICYCLING STATISTICS 1991

source: Bicycle Institute of America.

- *More than 93 million Americans ride bicycles.(50 million adults; 43 million children)*
- *25 million adults cycle regularly - average once a week.*
- *Bicycling is the 2nd most popular form of recreation after walking/hiking. (both nationally and in Arizona).*
- *15 million Americans ride mountain bicycles - the fastest growing form of recreation in the U.S.*
- *3.5 million Americans regularly commute to work on a bicycle.*

2.2 TYPES OF CYCLISTS AND THEIR NEEDS

Bicycling can no longer be considered just an activity for children. It has become a very serious and popular form of adult recreation and exercise, as well as a relatively low-cost, efficient means of transportation for people of all ages. The challenge of providing adequate facilities, programs and opportunities is in representing this wide range of skills, knowledge, interests and needs.

The **Child Bicyclist**. This group generally lacks the experience, training and judgement to deal effectively with on-street conditions. They tend to ride on sidewalks, playgrounds, driveways and residential streets near their homes. Safety, education, and safe routes to schools are important concerns as two-thirds of all bicycle/motor vehicle accidents occur to young people under the age of 15. According to the city-wide survey conducted by the Bikeways Committee as part of this report, 82% of the youth under the age of 12 have ridden a bicycle in the past year.

The **Recreational Rider**. There are many types of recreational riders. Competition road racing, mountain biking, casual social rides, and riding for exercise and physical fitness are some of the reasons for recreational bicycle riding. In general, recreational riders prefer separate paths and low volume streets. According to the survey, 92% of the bicyclists in Flagstaff include recreation as a reason for riding a bicycle.

Commuter and Utility Bicyclist. Commuters include those who ride to work and those who ride to school. The most direct routes are usually chosen and those with the least stops or delays. These bicyclists may prefer to ride on low volume streets or paths but often choose to ride on streets with a high traffic volume as the most direct route. Utility trips may include errands to stores, to the library, or to visit friends. Provision of safe, direct routes and adequate bicycle parking facilities will help to encourage the use of bicycles as a form of everyday transportation.

The **Hybrid Cyclist**. Recent trends indicate many riders are becoming involved with more than one type of bicycling. Today's bicyclist may commute to work, take casual off-road recreational rides, work out on vigorous exercise rides, enter racing events both on and off-road, and try long-distance bicycle touring. Many new bike designs reflect the multi-purpose needs of this diversity of bicycling styles. Bicycle facilities and programs should also reflect this variety of needs.

Planning efforts need to address the needs of each of these individual groups. In general, the primary concern for children is safety and education. For the recreational rider, separate paths, access and safety are of primary interest. For transportation, commuting and utility trips, longer, continuous bike paths and lanes, as well as improved road conditions are the most important concerns.

3.0 EXISTING CONDITIONS

3.1 SUMMARY OF BICYCLE SURVEY RESULTS

The Ad Hoc Bikeways Committee mailed a bicycle survey to 500 households in six neighborhoods in Flagstaff in the fall of 1990. (Only 493 surveys were actually delivered due to addressing problems. See the Appendix, Section 7.5, for the methodology used to generate a representative sample.) The survey was an attempt to find out people's attitudes about bicycling in Flagstaff and also to ascertain bicyclists' habits, routes, etc. Of the 493 households surveyed, 37% completed and returned the surveys, a total of 182 households containing 527 people. A summary of the findings is presented here with a more complete analysis in the Appendix.

Almost three-fourths (74%) of the households that responded to the survey have at least one member who has ridden a bicycle in the past year. 61% of the individual respondents have ridden a bicycle in the past year and 39% have not. The main reason given by non-cyclists for not riding is not having a bicycle.

The average age of the respondents is 31. Children and teenagers tend to ride more than adults; 82% of youths age 12 and under, 74% of teenagers age 13 to 19, and 56% of adults age 20 and over have ridden a bike in the past year. However, in actual numbers there are more adults riding bicycles than children.

According to the survey, bicyclists in Flagstaff ride an average of about 13 miles per week. Recreation is the most common reason given for riding (92%), with exercise the second (71%) most common reason, and 34% riding bicycles to do errands. 22% of the survey respondents list riding their bikes to work as a reason for riding. National statistics indicate on a daily basis bicycle commuters are closer to 2-3% of the transportation mix. The survey results indicate that 22% of the bicyclists in Flagstaff at least occasionally ride their bikes to work. The routes or areas most commonly used by bicyclists who responded to the survey are: Downtown (52%), NAU (45%), Santa Fe Avenue (45%), Beaver Street (42%), Cedar Avenue (37%), and Fourth Street (36%).

Two-thirds of the bicyclists surveyed do not wear a helmet when riding. Children do slightly better than adults; 37% of children, 31% of teens, and 33% of adults wear helmets most or all of the time. This may reflect the fact that many children receive bicycle education safety classes. Nationally, less than five percent of bicycle riders wear helmets.

Nineteen bicyclists who responded to the survey have been in an accident involving an injury while riding in Flagstaff in the last three years. This represents about 6% of the bicyclists responding to the survey. 62% of the respondents are interested in more education on bike safety, an indication that offerings on this subject would be well received.

An overwhelming majority of those surveyed (95%) feel there is a need for more bike paths and bike lanes to separate car/bike traffic in Flagstaff. Both cyclists and non-cyclists responded to this question, and non-cyclists' answers, when tallied separately, still reflect a very large majority in favor of more bike paths and lanes (91%). Responses to a separate question on the four most needed improvements in the present system also indicate a desire for a continuous system of bike paths. 79% of the respondents feel that this is a top priority. The other needed improvements cited most often in the survey include improved bikeway and street surfaces (56%), educating cyclists on traffic laws (51%), and enforcing traffic laws for cyclists (47%).

3.2 ASSESSMENT OF EXISTING FACILITIES AND POLICIES

1979 FLAGSTAFF BIKE PLAN

In 1979, a citizens' committee developed the "City of Flagstaff Bike Plan", a report similar in purpose to this one. At that time, there were practically no bikeways in Flagstaff. Since the 1979 report, interest in cycling, particularly in the adult population, has increased significantly. As traffic becomes more congested, parking space limited, and energy less available and more expensive there is much expectation that the use of the bicycle as a mode of transportation and recreation will increase. Between 1979 and 1991 there has been significant increase in the development of bikeways within the city. Notable in these developments is the initiation of the Santa Fe bike path, and the designation of bike lanes and routes on many of the city streets.

The 1979 Flagstaff Bikeway Plan is based upon six project goals designed to "insure the continued safety of cyclists, and the use of the bicycle as an alternative to the automobile". These are still considered major goals of this Committee.

1. Make bicycling safer in the Flagstaff area;

2. Encourage bicycle use for everyday transportation needs;

3. Encourage cycling for recreational, sport and physical fitness purposes;

4. Develop a bikeway network which provides suitable inter-city [sic] lines and connections to attractions outside of corporate limits;

5. Increase opportunities for fuel conservation. Reduce concentrations of both gaseous and particulate pollutants, and reduce noise levels in the Flagstaff area;

6. Encourage educational and registration programs designed to reduce bicycle theft, and to aid in the enforcement of state and local bicycling laws.

EXISTING ROUTES

The City of Flagstaff currently has approximately 20.75 miles of bikeway system. Of this, 3.45 miles are bicycle paths, 7.8 miles are bicycle lanes, and 9.5 miles are shared roadways. (see: Section 4.2 for Definitions) The system as a whole is currently in short sections and is not continuous in nature. Some sections are in good condition and only need regular maintenance; other sections need major reconstruction at this time.

An assessment of existing bikeways, conducted by committee members in the summer and fall of 1990, revealed some serious deterrents to extensive use of the present system. Some of the more obvious concerns are as follows:

1. The lack of continuity between segments of the system is inconvenient and a threat to the rider's safety.

2. The generally poor repair of the curbs, gutters and pavement surface.

3. The problem of excessive cinders and debris on the route surface.

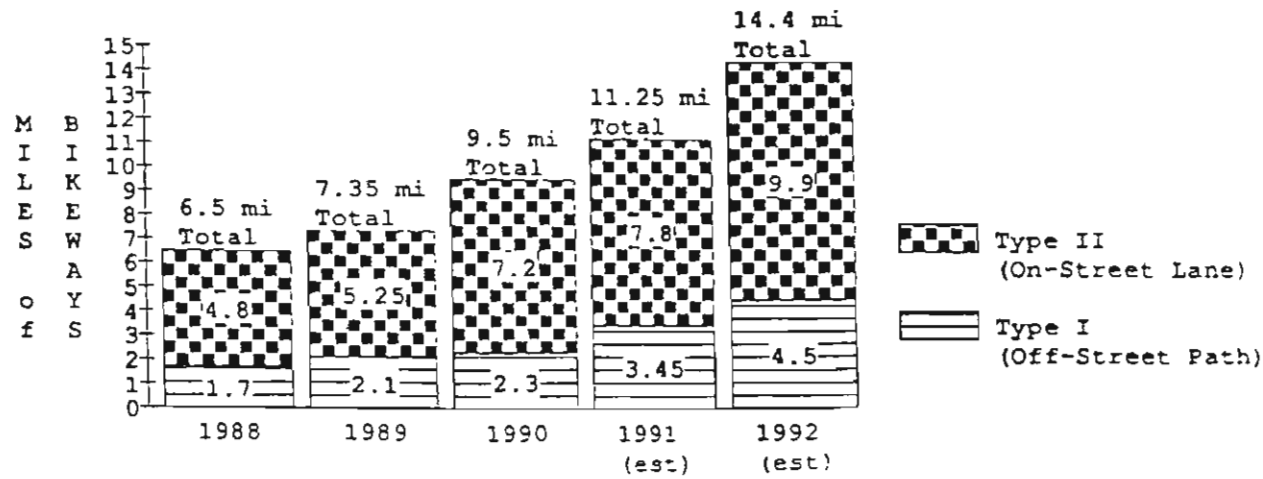
4. The lack of designated, improved bicycle routes add to the hazards of riding.

5. The lack of safe and convienient bicycle parking facilities discourages the use of bicycles in shopping areas and activity centers.

6. The north-south division of the city by the Santa Fe Railroad tracks presents access problems for cyclists.

These defects may cause many potential riders to choose other forms of transportation. The Ad Hoc Bikeways Committee is encouraged by the interest and support of the City Council and city staff to develop a more functional system of bikeways. We believe this continuing effort will encourage cycling as a convenient, safe, and healthful alternative to automobile transportation within the city.

Miles of Existing and Proposed Bike Paths and Lanes in Flagstaff.



3.3 CITY OF FLAGSTAFF BICYCLE LAWS AND REGULATIONS

For City of Flagstaff laws and regulations pertaining to the use of bicycles, refer to the City Code, Chapter 5, BICYCLES, Section 9-5-1 through 9-5-17. Selected regulations are included here:

9-5-1: APPLICATION OF PROVISIONS:

(B) The regulations of this Chapter in their application to bicycles shall apply when a bicycle is operated upon any highway or upon any path set aside for the exclusive use of bicycles subject to those exceptions stated in this chapter.

9-5-2: TRAFFIC LAWS APPLY:

Every person riding a bicycle upon a roadway shall be granted all the rights and shall be subject to all the duties applicable to the driver of a vehicle by this Chapter, except as to special regulations in this Chapter which by their nature can have no application.

9-5-3: RIDING ON BICYCLES:

(A) A person propelling a bicycle shall not ride other than upon or astride a permanent and regular seat attached thereto.

(B) No bicycle shall be used to carry more persons at one time than the number for which it is designed and equipped.

9-5-4: CLINGING TO VEHICLES:

No person riding upon any bicycle, coaster, roller skates, sled, or toy vehicle shall attach the same or himself to any vehicle upon a roadway.

9-5-5: RIDING ON ROADWAYS, BICYCLE LANES, AND BICYCLE PATHS:

(B) Every person operating a bicycle upon a roadway shall ride as near to the right side of the roadway as practicable, exercising due care when passing a standing vehicle or one proceeding in the same direction.

(C) Persons riding bicycles upon a roadway shall not ride more than two (2) abreast except on paths or parts of roadways set aside for the exclusive use of bicycles.

(D) Whenever one or more lanes of a roadway have been designated and marked as bicycle lanes, bicycle riders shall use those lanes and shall not use the roadway.

(E) Whenever a path has been provided and designated as a bicycle path adjacent to or near a roadway, bicycle riders shall use that path and shall not use the roadway.

9-5-6: CARRYING ARTICLES:

No person operating a bicycle shall carry any package or article which prevents the driver from keeping at least one hand upon the handlebars.

9-5-7: LAMPS AND OTHER EQUIPMENT:

(A) Every bicycle when in use at nighttime shall be equipped with a lamp on the front which shall emit a white light visible from a distance of at least five hundred feet (500') to the front and with a red reflector on the rear, which shall be visible from fifty feet (50') to three hundred feet (300') to the rear when directly in front of upper beams of motor vehicles.

(B) No person shall operate a bicycle equipped with a siren or whistle.

(C) Every bicycle shall be equipped with a brake which will enable the operator to make the braked wheels skid on dry, level, clean pavement.

9-5-8: BICYCLE LICENSE:

It shall be unlawful for any person to operate or use a bicycle propelled by muscular power upon any of the streets, alleys, or public highways of the City without first obtaining from the Clerk a license therefor.

9-5-10: LICENSE TAGS:

The Clerk shall designate and provide tags for the use of the license and direct the manner of placing such tags on the bicycle by the licensee, which tag shall at all times be attached to the bicycles.

9-5-13: RIDING ON SIDEWALKS:

It shall be unlawful for any person to ride a bicycle upon any sidewalk within the City with the exception of those sidewalks which have been designated as part of a bicycle path.

9-5-15: RIGHT OF WAY AT INTERSECTIONS:

Upon approaching an intersection, any person riding or operating a bicycle in a bicycle lane shall yield the right of way to all vehicles within or approaching such intersection; except, that all vehicles which must stop or yield before entering an intersection because of a stop or yield sign and all vehicles making a left-hand turn at an intersection shall not proceed into such intersection nor make such a turn without first yielding the right of way to all bicycles within or approaching such intersection, and shall proceed only when it is safe to do so.

9-5-16: LEAVING LANE:

Once having entered a bicycle lane, no person operating a bicycle shall leave such lane except at intersections; provided, that such person may dismount, walk the same, and be subject to pedestrian laws; provided, further, that such person riding a bicycle may leave the lane in order to make a U-turn, where permissible, or to turn into driveways on either side of the lane. Upon leaving the lane, the rider of such bicycle shall yield right of way to all vehicles:

9-5-17: DRIVING VEHICLES ACROSS BICYCLE PATHS OR BICYCLE LANES:

No person shall drive a motor vehicle upon or across a bicycle path or lane except to yield the right of way to an approaching authorized emergency vehicle or to enter a driveway and except to park such vehicle or leave a parking space. No person shall drive upon or across a bicycle lane as permitted by this Section except after giving the right of way to all bicycles within the lane.

RECOMMENDATIONS

1. Penalties should not be assessed against Driver's License for bicycle violations. A Driver's License is not required for operation of a bicycle and penalties to such are therefore applied unequally for drivers and non-drivers.

2. Evaluate State of Arizona bicycle laws for coordination with the City of Flagstaff Code section pertaining to bicycle regulations.

4.0 PROPOSED SYSTEMS AND PROGRAMS

4.1 ORGANIZATIONAL RECOMMENDATIONS

This Committee has concluded there must be continuing attention to bicycle-related issues and concerns if our stated goals are to be met. For this reason we strongly recommend that the City establish a permanent standing Bicycle Commission and/or hire or designate a City employee whose job would be to carry on the important work this bicycle task force has started. This person or committee would function as a bicycle transportation advocate/watchdog and would provide liaison with the City Traffic Commission, Police Department, Planning Division, Engineering Division, Parks and Recreation Department, Public Works, local schools, bike shops, volunteer organizations and interested citizens. Responsibilities would include:

a. Work with Community Development staff to insure bicycle facilities are designed and installed according to Bikeways Committee recommendations, and adopted City plans and standards, for both capital improvement projects and private development projects.

b. Work with Public Works Department, Community Development staff, ADOT and others to ensure that maintenance and hazard reporting are properly addressed.

c. Expand and develop adult re-education programs, as well as encouraging programs geared towards children. Encourage involvement in bicycle safety from service organizations and clubs, businesses, school groups, etc.

d. Write grant proposals for a variety of bicycle-related facilities and programs, along with finding any other sources of outside funding for bicycle advocacy and safety programs.

e. Oversee and provide direction for bicycle program expenditures.

f. Organize and advertise a variety of bicycle-related events throughout the City to promote greater use and safe operation of bicycles.

g. Serve as advocate, liaison, and coordinator for bicycle related matters to the Federal government, State agencies, Coconino National Forest, Northern Arizona University, Flagstaff School District, and other similar entities.

h. Coordinate bicycle program with pedestrian, mass-transit, and alternate mode transportation concerns, as per City objectives.

4.2 BICYCLE FACILITY RECOMMENDATIONS

The establishment of continuity in the bikeways system is an adopted policy of the Bikeways Sub-Element of Flagstaff's Growth Management Guide 2000. The Circulation Element of this plan considers bicycles "a legitimate mode of transportation along with the auto, public transit, and pedestrian modes". The implementation of this policy will require a greatly expanded system of bicycle facilities in Flagstaff. For bicycling to be a truly legitimate form of transportation, it must be made safer and more convenient than it is now. The Ad Hoc Bikeways Committee envisions a system which will enable a cyclist to travel to any part of the city on designated bicycle routes. The current system lacks continuity; although there are several designated bike routes, for the most part they are isolated sections disconnected from each other and from major destinations and transition points. The residents of Flagstaff agree that there is a need for more bikeways; in the bicycle survey done by the committee, 95% of the respondents (including non-cyclists) agreed with the statement "I feel there is a need for more bike paths and lanes to separate car/bike traffic."

A well-designed system would potentially reduce the incidence of bicycle-related accidents, encourage greater use of bicycles as a means of transportation, contribute to energy conservation and better air quality, and generally enhance our quality of life. As an urban amenity, a well developed bikeway system can contribute as an attraction for businesses to locate or expand in Flagstaff, and as an incentive for promoting bicycle-related recreational tourism.

DEFINITIONS

Adopted from: Manual On Uniform Traffic Control Devices, 1988 Edition.

a. **Bikeway** - Any road, street, path, or way which in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

b. **Type I (Bicycle Trail or Path)** - A separate trail or path from which motor vehicles are prohibited and which is for the exclusive use of bicycles or the shared use of bicycles and pedestrians. Where such trail or path forms a part of a highway, it is separated from the roadway, from vehicular traffic, by an open space or barrier.

c. **Type II (Designated Bicycle Lane)** - A portion of a roadway or shoulder which has been designated for use by bicyclists. It is distinguished from the portion of the roadway for motor vehicle travel by a paint stripe, curb or other similar device.

d. **Type III (Shared Roadway)** - A roadway which is officially designated and marked as a bicycle route, but which is open to motor vehicle travel and upon which no bicycle lane is designated.

e. **Bicycle route** - A system of bikeways designated by appropriate route markers and by the jurisdiction having authority.

GENERAL RECOMMENDATIONS

1. Expand Bikeways System - Adopt the bikeways system described in this report and accompanying maps as the long-range bicycle plan for Flagstaff. Implementation of the bikeways system will require a commitment for the establishment of an ongoing permanent bikeways program. The system includes connections between existing bikeways to provide continuity, bicycle facilities to common destinations, major cross-town routes, and routes leading into and out of the city. The improvements recommended employ a combination of bike paths, lanes, and shared roadways.

2. Maintain existing system - Where conflicts arise concerning existing bikeway facilities, they should be removed, closed or restricted only as last resort, and only after a thorough review of alternatives and impacts to the city-wide bikeway system.

3. Continue to allow bicycles on all City streets - Bicycles are a legitimate mode of transportation and should continue to be allowed on all streets in Flagstaff. Bicyclists should be allowed to use the most convenient route, including all public streets (unless there is an adjacent path, as per code). Even though the construction of a continuous bikeways system will move most bicyclists on to lanes and paths, there will be gaps in the system and some of the major streets (such as Milton) are not likely to have on-street bikeways. Many experienced cyclists will prefer to use these roads as the fastest and most convenient routes, therefore access to these streets should not be restricted.

4. Expand and develop bicycle-related programs - Establish and support education, safety, enforcement and advocacy programs as necessary components of a comprehensive bikeway plan.

SPECIFIC RECOMMENDATIONS

Although completion of the Santa Fe Bike Path and improvements to the Downtown bike routes are recommended as high priority projects, the remaining specific recommendations should not be considered as a prioritized list. Scheduling of bikeway projects should remain flexible so as to allow coordination with related capital projects or private development.

1. **Santa Fe Bike Path** - Completion of the Santa Fe Bike Path is considered the highest priority for the proposed system of bikeways. It will be the major east-west route for bicyclists in Flagstaff when it is completed. It is heavily used already, even though it is not complete. Presently, only the center segment of the Santa Fe Bike Path has been completed between Switzer Canyon Drive and Fourth Street. Both the west segment to the downtown area and the east segment to the Mall should be completed as soon as possible.

Where high bicycle and pedestrian use is anticipated, the path should be a minimum of 10 feet in width. A centerline should be considered for two-way high-volume bike paths. Current plans indicate a path eight feet in width.

Northern Arizona University, residential and commercial areas, downtown Flagstaff, and the north-south cross streets that bisect the downtown area are some of the major destinations for riders heading west on Santa Fe. A proposed extension between Switzer Canyon Drive and Verde Street is an important and necessary part of the system, but it does not extend far enough. The Santa Fe Bike Path needs to be extended and connected to the downtown area.

The segment of the Santa Fe Bike Path from Fourth Street to Fanning Drive is scheduled to be constructed in the fall of 1991. This bike path will connect to residential and recreational areas, the Mall and other commercial areas, and numerous north-south routes through the City. The Committee highly recommends not delaying any further in working to complete the backbone of the bikeways system in Flagstaff.

The Santa Fe Avenue Master Plan and the Downtown Area Plan should be evaluated in terms of bikeway objectives so as to coordinate circulation linkages, signage, and possible land acquisition. The Bikeway Committee recommends that the City consider the importance of completing the Santa Fe Bike Path as justification for pursuing acquisition of land from the railroad along portions of Santa Fe Avenue.

2. **Santa Fe Bike Path Downtown Extension** - Convenient, direct, and safe bicycle facilities should be designated so as to allow cyclists on the Santa Fe bike path to continue west to Beaver Street. As discussed in the Downtown Area Plan, San Francisco St. and Beaver St. are proposed as a one-way couplet. This situation will create a number of problems in terms of available right-of way and traffic conflicts. San Francisco St. will be one-way northbound; Beaver St. will be one-way southbound. The only legal alternative for cyclists to continue through this area requires a very long detour, and this is not reasonable to expect from cyclists. There are several alternatives which could be implemented to improve this condition.

A. Continue the bike path/sidewalk on the south side of the railroad tracks between San Francisco St. and Beaver Street. The Downtown Area Plan proposes a landscaped park through this area. The bike path would cross San Francisco St. at the intersection with Santa Fe Ave. The two-way bicycle path would be adjacent to one-way vehicular traffic along a portion of the west side of San Francisco St. south of the intersection with Santa Fe Avenue. In addition to much vehicular traffic, there is a great deal of pedestrian movement in this area. Therefore, adequate bike path width and signage should be provided in this congested area. A dismount zone should also be considered for the bikeway/sidewalk if adequate width is unavailable. A 10 foot or 12 foot wide path is the minimum required for pedestrians and cyclists in heavy traffic areas. This is the preferred alternative.

Where used by maintenance vehicles, a 12 foot wide path is required. A centerline stripe should be considered on heavy use sections of path for two-way traffic.

B. Detour the bike route south to Phoenix Ave. The bike path would cross San Francisco St. at the intersection with Santa Fe Ave. and then turn south along the west side of San Francisco St., as above, but it would continue south to Phoenix Ave. Once again, a combination pedestrian-bicycle path/sidewalk would be necessary and the width should be a minimum of 10 feet or preferably 12 feet for shared use. Phoenix Avenue would be designated as a Type III shared roadway between San Francisco and Beaver.

C. Detour the bike route south to Phoenix Ave. utilizing the east side of San Francisco for the connecting link. Once again, this would necessitate a combination path/sidewalk, which may require additional right-of-way. The city staff will have to decide which of these routes (or other alternative routes) is most appropriate, but it is imperative that a route be in place when the one-way couplet is completed to prevent wrong-way riding on the block of San Francisco just south of Santa Fe Ave.

3. Beaver St./ San Francisco St. One-way Couplet - A high priority is the designation of bike lanes on both Beaver St. and San Francisco St. These two streets constitute a major north-south route on the west side of town, and bike lanes will be needed on both streets once the one-way couplet is in effect, as outlined in the proposed Downtown Area Plan. This will be an important segment in the continuity of the system, linking the Cedar Avenue bike lane with the Santa Fe bike path and NAU.

The condition of the pavement and especially the pavement edge on portions of Beaver Street and San Francisco Street is of extremely poor construction. This condition is very unsafe. As these streets are proposed for the location of bicycle facilities and,in fact, already receive substantial bicycle traffic, reconstruction of these streets should proceed as soon as possible.

Bike lanes should be installed on the right side of the street. A consistent system of information and warning signs should be employed on these heavily traveled streets.

4. Fort Valley Road - Another top priority is the need for bicycle facilities on Fort Valley Road. This is an important component of the system, as there are many destinations attractive to bicyclists on this road, including: the Museum of Northern Arizona, Schultz Pass Road, residential areas, and the route to the Grand Canyon. Commuters, recreation seekers, and touring cyclists use this route. It is possible that ADOT will turn this road over to the City of Flagstaff sometime in the future, and perhaps they will add bike lanes as part of any pre-transfer improvements. However, this is not a certainty, and the time frame is also unknown. Therefore, it is recommended that one of the following options be adopted:

A. If ADOT proposes any improvement projects on Fort Valley Road, every effort should be brought to bear to encourage or require the inclusion of bike lanes. Prior to the city accepting this street into the city system, full improvements should be required according to appropriate City engineering standards. This is no less than would be required from any private developer.

B. If all efforts fail at persuading or requiring ADOT to participate in the improvement of Fort Valley Road, the City should take responsibility for widening and including bike lanes on this roadway.

C. If it does not appear that this transfer will happen in the near future, the committee recommends that the pedestrian path which currently parallels Fort Valley Rd. between Navajo Dr. and Talkington Dr. be widened to 8 or 10 feet and improved and extended to Stevanna Way (and perhaps on to Cheshire). Such a path could serve as a combination pedestrian/bicycle path. This is the least desirable option for cyclists as there are many conflicts with intersections. On-street lanes have been proven to be safer than side paths, especially when there are conflicts with driveways and streets. Adequate signage and crosswalks should be installed so as to minimize dangerous conflicts.

5. Cheshire Via the Beaver/San Francisco Couplet to University Heights - A continuous north-south route could be designated from Cheshire, along Fort Valley Road, to the Beaver-San Francisco couplet through downtown, through NAU, crossing Milton at University Drive/Avenue, connecting to Beulah Blvd. and then south to University Heights Drive. This is a four-phase project.

First, the link from University Heights to NAU needs to be completed. This project is contingent on the realignment of University Drive and the continuation of Beulah Boulevard. On-street bike lanes should be included on these streets. If Beulah Blvd. is not continued, an off-street path should be installed between Forest Meadows Avenue and University Avenue.

Second, coordination with NAU will be needed to obtain right-of-way through campus. Knoles Drive could be used to connect University Drive with Butler Ave. Riordan Ranch Street could be an alternate route from University Drive to the north part of the campus. It is in the interest of NAU, as well as the City, to provide bicycle routes that lead to off-campus housing and commercial areas.

Third, the route through downtown will need to be improved and upgraded. Finally, adequate facilities need to be in place from the downtown area to Cheshire.

6. Enterprise Road - A bike route is needed on Enterprise Road to connect the existing bike path on Santa Fe Avenue with the proposed bike lanes on Butler Avenue. An asphalt path next to the road would be a good short-term solution. When Enterprise is improved as planned, it is recommended that bike lanes be included on each side of the street. This segment is an example of the concept of providing continuity in the bikeways system. This short segment is considered a critical link between two major routes, and significant use is anticipated.

If Enterprise Road is continued north of Santa Fe Avenue to Ponderosa Pkwy. or Forest Avenue, bike lanes should be included. Ponderosa Parkway should then be designated as a shared roadway to connect Enterprise Road with Turquoise Drive.

7. Lockett Road - Lockett Road, between Fourth St. and Thomas Drive, utilizes an outmoded and potentially dangerous bikeway design. Presently, there is a two-way bike lane on the north side of the street. This runs counter to all rules of the road.

The City Code states in Section 9-5-5 that "Every person operating a bicycle upon a roadway shall ride as near to the right side of the roadway as practicable" and, "Whenever one or more lanes of a roadway have been designated and marked as bicycle lanes, bicycle riders shall use those lanes and shall not use the roadway".

The current situation is a potentially dangerous situation, as motorists do not expect bicyclists to be riding against traffic. Two options should be considered:

a. This street should be striped, with a one-way bike lane on each side of the street. This will require restricting parking on each side of the street. This is necessary if the city is to replace this outmoded stretch of bike lane with a legal, safer alternative.

b. It may be possible to stripe the lanes to allow parking to remain with an adjacent bike lane. The vehicle lanes would be striped to an eleven foot width. The existing two-way bike lane on the north would be reduced to a four (4) foot one-way lane. A five (5) foot lane would be installed on the south side of the street adjacent to the parking. This condition is generally less desirable due to conflicts with car doors opening into the bike lane. The level of parking occurring on this street should be evaluated further to determine the impact to each option.

Bike lanes should be installed on the east end of Lockett Road from Thomas School to Fanning Drive, and then south to the Santa Fe bike path. In this way, a continuous east-west route will be created from Santa Fe Ave. to Cedar Ave., thereby connecting to the north-south downtown couplet.

8. Izabel Street - A shared roadway, Type III bike route is recommended on Izabel Street between Cedar Avenue and Arrowhead Avenue. The connection between Cedar Ave. and Izabel St. is not direct, as Izabel St. terminates at a cul-de-sac in front of Coconino High School. It is recommended that a park be created at the north end of Izabel, with a bike path running through the park to connect to the bike lane at the intersection on Cedar. Bike lanes should be installed on Arrowhead between Izabel and Santa Fe Avenue. West Street is a narrow, heavily traveled arterial street. Izabel would provide an attractive alternative as a less congested parallel route for cyclists.

9. Arrowhead Avenue - As noted in #8, a bike lane is needed on Arrowhead Avenue to connect the route on Izabel with the path on Santa Fe Avenue.

10. Old Town Springs Railroad Crossing - A pedestrian/bicycle crossing of the railroad tracks between West Lower Coconino Ave. near the Old Town Springs on the north side of the tracks and Globe St. on the south side of the tracks is very much needed. This crossing is already an unofficial one, and many people use it each day, including schoolchildren. It is the most direct (although not safe or legal) route children have to get from their homes on the south side of the tracks to their schools on the north side of the tracks. This unregulated crossing will continue to be used until an official one is constructed because it is the most practical route. There are three alternatives which could remedy this situation. The first option is recommended.

A. The construction of an underpass or tunnel under the tracks would interfere minimally with the railroad. Construction could integrate effectively with existing conditions since the railroad tracks already sit on a raised bed. The disadvantage of this alternative is the possibility of unscrupulous people loitering in the tunnel, but if it were short, with an unobstructed view to both sides, this should not be a significant problem.

B. The construction of a grade crossing would have to be cleared with the railroad, but perhaps this could be accomplished, since they have had such a problem with unofficial use of this crossing. This would be the most inexpensive alternative.

C. A third possibility is the construction of a bridge over the tracks. Access to the bridge would have to be from an easy grade, as people are less likely to go out of their way to use excessively long ramps or stairs. Also, this could be expensive, but should be considered if neither of the other options appears feasible.

11. Old Town Springs Loop - If a bicycle/pedestrian railroad crossing is installed in the Old Town Springs vicinity, a route should be designated through the area to this facility. A shared roadway (Type III) would continue west on Clay Avenue from the intersection with Milton Road. Depending on the location of the crossing, the route would turn north on either Globe Street or Kingman Street. The crossing would connect to Lower Coconino Avenue, thence to Coconino Avenue and on to Santa Fe Avenue.

12. Fourth Street Railroad Crossing - (see: No.10., Old Town Springs crossing for options) Another area where a railroad crossing for bicycles would be beneficial is near the intersection of Santa Fe Ave. and Fourth St. A crossing between this intersection on the north and Industrial Drive on the south would greatly facilitate both bicycle and pedestrian traffic between the places of employment and residential areas south of the tracks and the residences, businesses and retail areas north of the tracks. Utilizing the existing underpass associated with the drainage channel across from First Street may be the best option at this time. Depending on traffic concerns, it may be desirable to designate either a shared route or lanes on Fourth Street south of Santa Fe.

13. The Mall Crossing - In East Flagstaff, there are several bike lanes and routes (Linda Vista Dr., Lockett Rd., Kaspar Dr., and Lynch Ave.) which all funnel into an area on the north side of Santa Fe Avenue near the Mall. There is a pedestrian activated signal at the mall crossing, but access for pedestrians, as well as bicyclists along the north side of Santa Fe Avenue (Hwy 89) is unsafe and inconvenient due to wide driveways and lack of designated routes.

The installation of a crosswalk with bicycle activated sensors at Kaspar Dr. (Lynch Ave.) would alleviate some of this problem. Bicycle routes in the surrounding vicinity should be further studied for continuity and safety. A comprehensive study of this area is sorely needed, since the Mall is a frequent destination for both bicyclists and pedestrians.

Long range plans indicate Linda Vista Dr. is proposed to extend to Kaspar Dr. in the direction of Lynch Ave. and Highway 89. The intersection at Hwy 89 (Santa Fe Ave.) and Kaspar Dr. (Lynch Ave.) is proposed to receive a signal. This configuration should receive bicycle facilities.

14. Christensen School - A bike path to Christensen School on the west side of Highway 89 would enable children from many residential neighborhoods in the area to ride their bikes to school. This path would start at Winter Drive, offering access to the Christmas Tree Estates subdivision. Cyclists from the Smokerise area would cross at the traffic signal at Highway 89 and Smokerise Drive. From this intersection, the path would head southwest, paralleling Highway 89, until it reaches Cummings Street, the location of Christensen School. This path would also connect to the Lynch Avenue bike route, thereby linking the Mobile Haven neighborhood to the rest of the city. Also, this bike path would provide access to the Mt. Elden trailhead.

15. East Flagstaff Traffic Interchange - Another problem in East Flagstaff is the lack of connection between Fairfield and other neighborhoods on the south side of Interstate 40 and the Mall and neighborhoods on the north side of Santa Fe Ave. There is a combination sidewalk/bike path on the east side of the bridge over Interstate-40 (fence height may need to be raised here), but it is not maintained, and it does not extend to the bridge across the railroad and Santa Fe Ave. It is recommended that the existing path be maintained and that any future improvements to the bridge over Santa Fe Ave. include bike lanes or a separate path of some kind.

It may be possible to designate a round-about route through this area if East Industrial Drive is paved. The route would utilize the side path on the bridge across the Interstate. North of the Interstate turn east on Motel Drive. Industrial Drive loops off Motel Drive and heads to the west, under the bridge that crosses the railroad, towards Fanning Drive and the Santa Fe bike path. This may not be the most direct route, but would provide a legal alternative for a north-south crossing, pending a better solution.

16. East Butler Avenue - The proposed bike lane on Butler Avenue should be extended from Enterprise Ave. to Foxglenn St., connecting to the route circling Continental Country Club.

17. County Club Drive - Construct an eight or ten foot wide bike path on the east side of Country Club Drive between Cortland Blvd. and Bear Paw Drive. This will provide connection between residential areas and the shopping area at Continental Plaza. The Growth Management Guide 2000 promotes neighborhood scale development with interconnections between residential and commercial areas.

18. East Old Highway 66 - Bike lanes should be included from Santa Fe Ave. to the city limits. This will involve striping and some resurfacing of the existing shoulders.

19. West Old Highway 66 - Provide bicycle facilities from Milton Road to Woody Mountain Rd. Continued development of employment centers, residential areas, and recreational opportunities in this area points to the need for additional bicycle facilities to accommodate increasing use. Include on-street lanes as reconstruction or widening occurs; install separate paths or wide sidewalks where on-street width is limited and driveway conflicts are minimal. Utilize Riordan Road as a connection to Milton Road.

20. Smoke Rise Loop - Designate Smoke Rise Drive as a shared roadway from the intersection with Highway 89 North to Dodge Avenue. Continue the Type III shared roadway south on Dodge Avenue to Empire Avenue. Dodge Avenue from Empire to Railhead Avenue should be designated with bike lanes or wide shared lanes due to a substantial level of truck traffic in this area. Turn west on Railhead Avenue with designated bike lanes to Spur Street. Spur Street is wide enough to be designated a shared roadway connecting to East Old Highway 66.

21. University Heights Loop - A bike route loop through University Heights (on University Heights Drive North and South) will act as a collector for bicyclists in this rapidly growing area, and will connect to the FUTS trail along the Sinclair Wash (Hwy 89A) and to the old tunnel under I-40 from Woodlands Village, also to be developed as a FUTS trail.

22. Lake Mary Road - Lake Mary Road is a heavily used bicycle recreation area, and the lack of bicycle facilities on this road makes it very hazardous. It is strongly recommended that the city construct either lanes or a path along this road from Beulah Blvd. to the City limits. Reconstruction of Lake Mary Road is scheduled as part of the 1988 Street Improvement Bond Program and bicycle lanes are to be included to the City water treatment plant.

23. Lone Tree Loop - Bike lanes are included as part of the Lone Tree Road reconstruction project between Butler Avenue and Interstate 40. Construction on this project has begun in 1991, however, it appears the final phases of this project may be delayed due to funding questions concerning the creation of a new traffic interchange on I-40. Until this is resolved, Type III bicycle facilities should be designated on the existing alignment of Lone Tree Road south to Zuni Drive, and continuing west on Zuni Drive to connect with Lake Mary Road.

4.3 DESIGN GUIDELINES

GENERAL ENGINEERING GUIDELINES

The City of Flagstaff, Engineering Design and Construction Standards & Specifications, Section A, states that all design and construction shall be done in accordance with:

- City of Flagstaff, Engineering Design and Construction Standards and Specifications
- Maricopa Association of Governments Uniform Standard Specifications for Public Works Construction (MAG Specs) and Maricopa Association of Governments Uniform Standard Details for Public Works Construction (MAG Details)
- City of Flagstaff Addenda to the MAG Specifications and Details.

Although bicycle lanes are addressed on cross sectional views of streets, there does not appear to be an official policy statement on the design of bicycle facilities.

According to City of Flagstaff, City Code, Title 9, Chapter 1, Section 9-1-1, paragraph B, "The Manual of [sic] Uniform Traffic Control Devices, as amended and adopted by the Arizona Highway Commission, in conformance with Title 28, Chapter 6, Article 3 of the Arizona Revised Statutes, 1971, together with all subsequent official rulings on requests for interpretations, changes and experimentation, is hereby adopted as the official document governing all aspects of the installation and operation of traffic-control devices on public ways within the City. (1978 Code)"

This official position addresses traffic-control devices used in conjunction with bikeways; however, it does not confront a design criteria policy statement. Design criteria for bikeways is compiled from several different sources.

The Arizona Bicycle Task Force produced a set of standards for bicycle facilities with their Arizona Bicycle Facilities Planning & Design Guidelines (1988). This is an excellent reference for bicycle facility design in Arizona, and it is recommended that the city follow these standards and guidelines.

The American Association of State Highway and Transportation Officials (AASHTO) also published a document in 1981, the "Guide For Development of New Bicycle Facilities", to update the bicycle transportation standards in their "Green Book". A major revision of this document is under way, and will include input from the National Bicycle Policy Project's "Task Force on Engineering Publications", an independent committee of bicycle experts and engineers. These revised standards should be reviewed by city staff.

SPECIFIC DESIGN GUIDELINES

In addition to the general engineering design recommendations, the committee has identified a few specific concerns in the design and construction of bikeways in Flagstaff.

1. All new construction of major city roadways, and improvements to existing major roadways should address the impact on bicycle and pedestrian accessibility, and the impact to the city-wide bikeway system. Bike lanes or paths should be included where appropriate, as per design guidelines.

2. On new roadways where prevailing traffic speeds are expected to exceed 35 miles per hour, separate bike paths may be safer and more appropriate than on-street lanes. Design guidelines and location criteria should be considered on high speed streets (i.e. adequate right-of-way width, traffic volume, intersection and driveway conflicts). Another alternative is wider bike lanes.

3. On the recently constructed Cedar Avenue bike lanes there are arrows, diamond symbols, and the words "bike lane" painted on the pavement surface. This is highly visible to motorists, and alerts them to the fact that they are sharing the road with bicyclists. All bike lanes, both new and existing, should receive this treatment which can be part of the Engineering Standards and the Traffic Engineering policies.

4. The installation of a "rumble strip" of corrugated pavement along the stripe separating the traffic lane from the bike lane should be considered. This would not have to be very wide; 8 to 12 inches would be enough to alert motorists and cyclists should they cross over into the wrong lane.

4.4 SIGNAGE AND TRAFFIC SIGNALS

A consistent system for signage of bike lanes and routes needs to be adhered to. Signs are a critical component of a well functioning bikeway system. Signs are used to direct, inform, and warn of hazards. In the present system, some routes, such as the lane on Turquoise Dr., have signs every few hundred feet, while others, such as the North Beaver St. route, go for several blocks without any bike route signs. The standards set forth in the MUTCD, AASHTO, ADOT, the Arizona Bicycle Facilities and Design Guidelines, and the City of Flagstaff Engineering Standards should be followed, both on new projects and on established routes.

All bikeways should be signed frequently enough for bicyclists to be able to tell that they are still on the bike route. Continuous routes could be named or otherwise designated for easy identification by cyclists. A numbering system could be developed for bicycle routes or routes could be named (i.e., Santa Fe Bike Path, Lake Mary Bike Route). Destination markers are recommended for bike routes (Downtown 1.5 miles, The Mall 2 miles, City Park, etc.).

At intersections where the traffic signal must be triggered, provide adequate mechanisms for bicyclists. Activation buttons, if used, should be easily accessible from bikes. If the pedestrian signal activator button is not readily accessible, a separate one should be provided for bikes. The location of the signal activator for bikes should be oriented for use from the on-street bicycle lane or route.

Bicycle-sensitive loop detectors installed in the pavement have been successfully used in other cities. Modification of standard detector loop design can be relatively inexpensive when installed at the time of new construction. Pavement markings are used to indicate the area of greatest sensitivity for bicycle detection.

Bicycle friendly traffic signals should be installed at the intersections on the Santa Fe Bike Path (Enterprise, Steves, Fanning, San Francisco). Both bicyclists riding on the Santa Fe bike path and motorists making turns at the intersections exhibit confusion about who has the right-of-way. The pedestrian crossing signals should be easily accessible to bicycles. It would also be advisable to erect signs to warn motorists to stop behind the crosswalks, and signs to warn bicyclists of cross traffic.

RECOMMENDATIONS

1. Develop and use a consistent city-wide system of signs. Utilize the standards set forth by MUTCD, AASHTO, ADOT, ABTF, and City of Flagstaff Engineering Standards.

2. Continuous routes should be named or numbered so that cyclists can easily identify the route they need to reach a destination.

3. Signs indicating destinations and major features should show direction and distance.

4. Bike lanes and paved paths should use a consistent system of painted surface markings, such as diamond symbols, bicycle symbols, arrows, and the words, "bike lane".

5. Signs graphically indicating a map of the system or major route should be strategically placed at major route intersections, activity centers, and trailheads.

6. At intersections where the traffic signal must be triggered, provide adequate mechanisms for bicycles. Activator buttons should be located for access from bicycle facilities. Bicycle-sensitive loop detectors should be considered for installation in the pavement.

4.5 BICYCLE PARKING

Availability of secure parking facilities close to destination points is an important feature of the bikeways system. Location, convenience, security, availability and demand are factors to be considered in siting of these support facilities.

A lack of secure parking may be a deterrent to bicycling, whereas provision of good facilities has been shown to encourage bicycle use. The City should provide bicycle parking at all public facilities and encourage the private sector to provide bicycle parking at local businesses.

RECOMMENDATION

1. Bicycle parking should be provided close to destination points such as schools, public facilities, major transit stops, employment centers and shopping centers.

2. Bicycle parking facilities should be provided in convenient, visible and secure locations.

3. Frame securing rack types should be used, rather than wheel mounting racks.

4. Locate bike parking facilities under covered areas where possible, as considerable ridership occurs during inclement weather.

5. Limited access fenced bike parking corrals are useful in certain circumstances. Compounds with access limited to arrival and departure times should be considered for elementary schools. Keyed access areas may be more practical for large employment centers. In either case, the compound should be located in an area of high visibility.

6. For commercial development, consider criteria to require bicycle parking to be provided in addition to or instead of required automobile parking, at an appropriate ratio as determined by staff.

4.6 MAINTENANCE

Maintenance is essential for safe and enjoyable riding. Bike lanes, paths and routes need to be free from cinders and debris, and their surfaces should be maintained to an acceptable standard. Maintenance of bicycle facilities in Flagstaff is based on seasonal concerns. One of the biggest problems we have in Flagstaff is the accumulation of cinders on the bike lanes and paths in the winter. It is essential that bike lanes and paths be plowed and swept with the same frequency and thoroughness as the roadways. Over half of the respondents who completed the bicycle survey indicated that improved bikeway and street surfaces are one of the four most needed improvements in the current system. Bike lanes and facilities that are in poor condition should be reconstructed or repaved, as necessary.

RECOMMENDATIONS

1. Inspect bikeways on a regular schedule and repair as necessary.

2. Remove snow from bike paths and on-street bicycle facilities at the same time as snow removal for automobiles.

3. Remove cinders associated with snow maintenance as soon as possible from bicycle facilities.

4. Bikeways should be maintained free of cinders, litter and debris.

4. Trim tree branches, shrubs and other vegetation from bikeways.

5. Mark unremovable dangers with adequate signage.

6. Provide hazard reporting system easily understood by public; specify and advertise City office in charge of maintenance and hazard abatement.

4.7 DRAINAGE GRATES

The City of Flagstaff Engineering Standards include specifications for drainage grates which are safe for bicycle traffic. Parallel bars on the older style of grate can trap the front wheel of the bicycle and cause the cyclist to lose control. Replace unsafe drainage grates on all roadways with bicycle-safe grates. Flat bars perpendicular to the curb should be welded to the unsafe grate, as per Engineering standards.

4.8 UTILITY TRENCHING

Excavations in roadways occur on a regular basis both for City utilities and for private development. All excavations in the roadway should be resurfaced smooth and flush with the existing surface.

It should be noted that even the most professional paving often results in some degree of settling and unevenness along the edge of a patch. Therefore, it is recommended that when excavations occur within a designated bike lane or path, the cut should be the full width of the route, so as to avoid an uneven and dangerous surface condition from longitudinal joints and cross-cuts.

4.9 DOWNTOWN AREA PLAN

With input from many interested members of the public, the Downtown Area Plan was prepared by consultants Winter & Company in late 1990, and released January 1991. The Bikeways Committee reviewed the draft plan in terms of the bicycle circulation system. Committee members met with the Downtown Area Plan Review Committee and conversations were held with the principal consultant, Nore Winter.

The Bikeways Committee determined that bicycling is not only an important issue within the downtown core area but is also important in terms of providing continuity in the City-wide route system. Routes to, from, and through the downtown core area are critical linkages in the proposed comprehensive city-wide bikeway system.

The Bikeways Committee recommends retaining the present system of two-way streets, and upgrading and installing bike lanes on Beaver Street from the University to Cedar Avenue.

The final report of the Downtown Area Plan recommends converting Beaver Street and San Francisco Street into a one-way couplet between Butler and Columbus Avenues. Installation of the north-south couplet will have a profound impact on bicycling in this area. Adequate bicycle facilities should be included with implementation of the couplet. Evaluation of this issue raises questions of available street width, removal of on-street parking, and designated bike lanes vs. wide shared lanes.

1. East-West

Completion of the Santa Fe Avenue bikepath as the City's major east-west bicycle route is recommended as the highest priority for the bikeway system. However, there is concern that the western terminus of the Santa Fe bikepath should provide safe and adequate linkage to and through the downtown area. Currently the proposed Santa Fe bikepath is indicated as terminating at a point south of Verde Street. Providing a designated route connection between this point and Beaver Street, south of Santa Fe, is important for safety and continuity.

2. North-South

Currently Beaver Street is indicated as the primary north-south bicycle route through the downtown area. South Beaver Street has bike lanes between the University and Phoenix Avenue. North Beaver is designated as a shared roadway but is generally regarded as congested and unsafe. Bicycle lanes should be installed on North Beaver, thereby providing a continuous route between the University and Cedar Avenue. If, however, Beaver Street and San Francisco Street are transformed into a one-way couplet, then bicycle facilities should be installed on both streets. Striped bicycle lanes should be installed the entire length of the north-south couplet, including through the downtown core area. The pavement surface on both streets is in very poor condition, especially along the edges, and should be reconstructed as necessary for safety purposes.

3. Core Area

In order to provide adequate width for safe bicycle travel on the one-way Beaver-San Francisco Couplet, parking will have to be restricted on the right side of the street for both San Francisco and Beaver Street. The Downtown Area Plan recommends utilizing a wide curb lane or shared roadway approach for San Francisco Street between Santa Fe and Birch. The Plan indicates 12 feet as a minimum width for this type of condition. The Committee recommends installing bike lanes through the core area. If a shared roadway is used, the minimum width should be 14 feet and information signs should be placed to alert motorists and bicyclists.

Additional bicycle parking facilities should be installed throughout the downtown area. Information and warning signs should follow a consistent pattern through the area.

4.10 NORTHERN ARIZONA UNIVERSITY BIKEWAYS PLANNING

Analysis of bicycle issues on the campus of Northern Arizona University offers examples of situations applicable to the city in general. The campus may be the city's single largest generator of bicycle use, not to mention vehicle traffic. It is in the interest of the University, as well as the City to offer alternatives to automobile transportation on and near the campus, thereby decreasing traffic congestion and air pollution on the campus and throughout the city.

NAU INTEGRATED TRANSPORTATION CONCEPT

Transportation in and around the NAU campus has long been identified as a problem area, particularly the often heavy traffic congestion which occurs throughout weekdays as a result of students and others "commuting" back and forth within the campus in their cars. The maze of interior parking lots and access streets in the north and central sectors also leads to many pedestrian/bicycle/auto conflicts. The automobile was a major design influence on the campus during the 1950's and 1960's, and that influence is still pervasive in the north and central areas. In addition to being a functional and safety problem, the profusion of internal streets and parking lots also lead to considerable visual clutter in an otherwise attractive campus environment.

The first step in improving the situation is to acknowledge that the various transportation systems (auto, bicycle, pedestrian, transit and parking) are interrelated and that a workable solution must view each of these systems as part of an overall, integrated transportation hierarchy which will balance the needs and priorities of the entire campus community rather than those of particular user groups or constituencies.

The recently completed Campus Master Plan strongly recommends reclaiming academic and residential core areas from the automobile and giving pedestrian and bicycle traffic definite priority in these areas. Exceptions must, of course, be made for service and emergency vehicles, which can use pedestrian walkways if necessary. The parking concept will shift from the very convenient but functionally troublesome apartment-style lots around each hall to storage lots on the campus periphery.

The pedestrian campus concept has already been adopted by a large number of American campuses. It seems to work well and is generally approved of once the many benefits of a pedestrian environment become obvious. Initial resistance fades as people adjust to the new system.

This concept will require that the campus shuttle be made much more convenient to potential users. It will also require that **pedestrian** and **bicycle** path networks be greatly improved as to appearance, convenience and safety. Pedestrians, bicyclists, automobiles, shuttle buses, and utility vehicles should be separated as much as possible. Implementation of this concept will take a number of years, and will probably occur in planned stages.

NAU RECOMMENDED BICYCLE PATH SYSTEM

According to the NAU Parking Services Administrator, there are approximately 4,700 bicycles on the campus at any given time. Reducing intra-campus auto traffic and parking problems will require improvements to the bicycle travel system. Bicycle travel in important core areas will be emphasized as second priority, behind pedestrian travel. The three major issues inherent in the bicycle path system are convenience for users, minimizing conflicts with autos and pedestrians, and provision of secure storage areas and racks.

Important considerations and components of the proposed system are:

The ideal bicycle path concept for the campus would be a bike loop inside the street (auto) loop and outside the most heavily used portions of the pedestrian path system. Convenient connections to surrounding student housing and shopping areas should also be provided at appropriate locations.

Important campus entrance connections for bicycles include:

North Entry via Beaver and Dupont Streets.

Riordan Road entry.

University Drive entry (perhaps on or near relocated University Dr.).

McConnell (or FUTS) entry into Southwest campus areas.

Pine Knoll entry (from proposed 4 lane Lone Tree Road with bike lanes.)

Eastern FUTS entry into campus via Sinclair Wash.

Separation of heavily-travelled bike and pedestrian routes will be implemented wherever possible. This can be through the use of curbs or grade differentials.

Cross-connections will be provided at convenient intervals up and down the campus.

Bicycle security is extremely important to bicyclists, especially on this campus where expensive mountain bikes are common. Bicycle parking and storage areas with theft-proof racks will be located near residence halls and heavy-use academic buildings. Covered storage areas would provide the desired weather protection. Bicycle "corrals" (some with student guards), and even multi-level bicycle parking garages have been used in other locations to allow "piggybacking" car and bike travel. Some adaptation of these concepts could be useful at NAU.

Dismount areas can be established in very heavily used pedestrian core areas to reduce conflicts.

If McConnell Drive is not blocked or otherwise eliminated as a through street between Knoles Drive and San Francisco Street, at least one bridge across it is a necessity if the heavy bicycle travel between north and south academic areas is to be accommodated safely.

Enforcement of regulations, perhaps via a Bike Patrol with citing authority, will also be necessary to keep bikes off pedestrian paths and to discourage riding through dismount areas.

Bike lanes can be installed along selected streets, where separate bike paths are not feasible.

Adequate identification and signing of bike routes is essential. Crossings must also be adequately signed to make bike travel more safe.

The campus bike system should be open to cross-campus bike traffic. The City should coordinate off-campus connections so as to allow an integrated city-wide system with mutual benefits for all involved.

(see: Appendices, figure A-2 for map)

4.11 BICYCLE PLANNING ON THE COCONINO NATIONAL FOREST

The City of Flagstaff is surrounded by the Coconino National Forest (CNF). In addition, approximately 60% of the land within the City boundary is either State Land or National Forest. The recreational use of bicycles on the CNF is a relatively recent activity; mountain bicycles have only been available since the early '80s. Therefore, planning for bicycles on the CNF is in its infancy and in need of greater attention.

The popularity of mountain biking has continued to show dramatic increases with advances in technology allowing greater numbers of cyclists to access trails and backroad environments. It is estimated that in 1983, there were only 200,000 mountain bikes in the United States. This number has grown astronomically to 11 million mountain bikes in 1989 and an estimated 15.5 million mountain bikes in 1991. According to the 1990 City of Flagstaff Bikeway Survey, approximately 92% of bike riders within the City ride their bikes for recreational purposes. Although the survey did not determine where bicyclists ride for recreation, it can be assumed that the CNF was heavily used because its close proximity to the city.

Mountain Bike: Fat tires added to light weight frame with high quality gears and strong brakes.

Popular areas for mountain biking on the CNF include: Fisher Point, Anderson Mesa, Woody Mountain, Observatory Mesa, and especially the Mount Elden Trail System.
Mountain biking is just one of many recreational activities allowed on National Forest lands. Hiking, horseback riding, hang gliding, skiing, motorcycling, as well as bird watching and picnicking may be encountered as part of the multiple-use recreational planning concepts included in the National Forest Multiple-Use Sustained-Yield Act of 1960.

Because the sport is relatively new, there are unique challenges for recreational managers. Conflicts between bicyclists and traditional trail users have occurred and a variety of impacts have been questioned. Although studies suggest only a very small minority of mountain bicyclists engage in inconsiderate or reckless behavior, the effect of this image may unfairly influence land use and recreation policies.

Opportunities exist to mitigate existing problems, such as crowding on the Mount Elden Trail System, and to pro-actively approach bicycle planning, in general, throughout the National Forest. Since most of the increase in use can be attributed to the population of Flagstaff, there is a need to coordinate bicycle management activities between the City of Flagstaff and the Coconino National Forest, so as to provide an enjoyable and satisfying experience for all trail users. The CNF should be encouraged to disperse use in crowded areas and provide services and facilities for a multitude of recreational uses, including increased mountain bike use.

RECOMMENDATIONS

Coordinate bicycle planning efforts between the City of Flagstaff and the Coconino National Forest through the designation of individual liaisons and the creation of a Bikeway/Trail Advisory Council.

1. Coordinate bikeway/trail locations to aid in dispersing recreational use.

2. Coordinate bikeway/trail locations so that a continuous network will exist between the City and the CNF.

3. Coordinate common signage on City and CNF bikeway/trails so that there is a continuity of signage between both entities. This recommendation would include common route numbers and common trail use guidelines using the established hierarchy-of-uses for various trail users.

4. Coordinate education efforts on trail etiquette between the City and the CNF.

5. Coordinate user friendly facilities at right-of-way fencing between City and CNF lands.

6. Coordinate between the City and the CNF in creating the Coconino Loop Trail System.

    a) The Coconino Loop Trail System would be a continuous multi-user group trail surrounding Flagstaff.

    b) Identify possible locations utilizing existing roads and/or trails.

    c) Coordinate with all potential user groups in the design and location of the trail.

    d) Explore funding possibilities through the Forest Service Recreational Initiative, Challenge/Cost Share Programs, Heritage Funds, etc.

7. Coordinate bikeway/trail opportunities between the City and CNF in the Forests' Recreation Opportunity Guide through a cooperative agreement between the City and the CNF.

    a) Publish a combined trail map of both City and CNF bikeways/trails. Include trail use and etiquette guidelines in this publication.

8. When trail conflicts arise between various user groups, an assessment should be made based on the hierarchy of solutions contained in this report.

HIERARCHY OF SOLUTIONS TO MOUNTAIN BIKE IMPACT

Signing:

Signage may be used to indicate general trail guidelines, regulations and proper trail etiquette. Information on multi-use trails is helpful for voluntary self-monitoring.
A hierarchy of trail use has been developed for bicyclists, hikers, and trail stock. A sign with graphic symbols indicating these relationships has been widely used (bicyclists yield to all other users; everyone yields to trail stock). This type of sign is highly recommended for multi-use trails. (see page 38. for sign example).
Signs may also be used to indicate trail speeds or other warnings.
Maps of trail system indicating conditions and distances should be posted at trailheads.
Trails can also be posted with route numbers or names.

Education:

Work with various user groups to educate bicyclists about low impact use, etiquette, and consideration of other users. Develop posters, brochures, and a logo or trademark as a recognized reminder of considerate cycling.
Develop training programs on low impact cycling for mountain bikers and conduct field workshops. Include this information in general safety programs presented to school children.

Design:

On new or reconstructed trails include design features that restrict speed and enhance sight distance; also build wide or pull-out sections to facilitate safe passing of cyclists, horses, and hikers. Barriers such as protruding rocks, roots, sharp curves, and water bars should remain or be installed in the trail where control of speed is desired.

One Way Only:

Designate the direction of travel on trails with very heavy use to avoid conflict. Travel may limited to up-hill direction only in some cases, however, an alternate return route should also be indicated. A loop configuration is best for this solution.

Patrolling:

Use properly trained volunteer groups to patrol and talk with cyclists.

Restrict Cyclist By Time And Day:

Allow for mountain bike use only at certain times when other use may be at lower levels. (example: mornings, afternoons, weekend/week day)

Restrict Cyclist By Season:

Riding on wet trails during the Winter snow season or the Summer monsoons creates ruts and possible erosion. The aesthetic qualities of the trail experience are perceived in a negative manner by other trail users. Therefore, restrictions or recommendations should be posted on trails at those times. (signs can be posted at trailheads or use notices in newspapers, on the radio or at bike shops, for example).

Separate Sections:

Construct separate connections and by-passes for mountain bike use where there is greatest congestion. (this is highly recommended for use at trailheads)

Construct Separate Routes:

Construct separate trails for mountain bikes where user support is demonstrated.

Shift Use:

Close certain areas to cycling and then allow and encourage use in other designated areas.

Close Trail To Cyclists:

This should only be used as a last resort after other efforts have proven ineffective.

INTERNATIONAL MOUNTAIN BICYCLING ASSOCIATION - RULES OF THE TRAIL

1. **Ride on open trails only.** Respect trail closures, private property, and wilderness areas.

2. **Leave no trace.** Don't litter. Stay on trail. Avoid wet trails if damage results.

3. **Control your bicycle.** Excessive speed and recklessness causes injury.

4. **Always yield the trail.** Use friendly greetings. Slow or stop for other users.

5. **Never spook animals.** Announce your approach and show respect when passing trail animals. Never intentionally disturb range or wild animals.

6. **Plan ahead.** Know route and weather conditions, maintain equipment, carry necessary tools, wear a helmet.

4.12 FLAGSTAFF URBAN TRAILS SYSTEM

INTRODUCTION

The Flagstaff Urban Trails System (FUTS - pronounced "foots") is planned as a city-wide interconnecting network of non-motorized transportation corridors and linear recreation areas. Various off-street trails are proposed to interconnect employment areas, activity centers, neighborhoods, schools, and parks throughout the city. FUTS offers and provides for an alternative means of transportation, informal exercise and recreational opportunities. Anticipated uses of such a system include: bicycling, hiking, jogging, cross-country skiing, educational activities, as well as pedestrian and bike commuting. FUTS promotes year-round full season opportunities for a diversity of uses.

Interconnection with the Arizona State Trail, Coconino National Forest trail system, and the Flagstaff Bikeways System creates an attractive regional recreation opportunity for visitors and residents alike. An extensive and easily accessible trail network would allow access to forest wilderness areas, canyons, cultural centers, national monuments, the Arboretum, the University, schools, and downtown Flagstaff. The natural greenbelt setting in which the Flagstaff Urban Trails System is primarily located secures open space and greenbelt land use, promotes enjoying the environment, and provides a diverse exposure to various native wildlife and plant life. The benefits are economic, social, and environmental.

(see: Appendices, figure A-3 for map)

HISTORY AND DEVELOPMENT

In 1987, the City Council adopted the Growth Management Guide 2000, providing policy and support for the urban trail system concept.
In 1988, Council dedicated 130 acres of City-owned land along the Rio de Flag Canyon to create the "backbone" of the system.
In 1989, city crews began construction of 1.2 miles of treadway through the Rio de Flag Canyon from O'Leary Street to the I-40 overpass.
In 1990, approximately 2 miles of preliminary trail development was laid in along the Sinclair Wash, through the NAU campus from O'Leary Street to the I-17 overpass at McConnell Drive.

Several projects are proposed for the 1991 season. The Sinclair Wash Trail - NAU Link should receive finishing treatment and will be continued to Fort Tuthill. Recycled concrete has been utilized for surfacing a portion of the Birch to Beal Link of the North Rio de Flag Trail. Construction of the Observatory Mesa Trail will be initiated, beginning at Thorpe Park.

The City already owns or has easements for a considerable amount of land required to place the framework of a trail system. Acquisition of additional right-of-way to secure these trail routes is an essential, continuing effort for the FUTS program. Utilization of major drainageways, utility easements, flood plains, scenic areas, high-slope areas, and less developable land provides appropriate locations for the trails.

PROPOSED PLANS

Approximately 25 miles of trail development are proposed through the FUTS program. It is anticipated that full improvement of the system will take several years. Proposed plans include: completing the North Rio de Flag Trail to the Museum of Northern Arizona, the East Rio de Flag Trail to Foxglenn Park, Sinclair Wash Trail to the Arboretum and Woody Mountain, the Bow and Arrow Wash Trail, and numerous shorter connecting links, such as those to Buffalo Park, Walnut Canyon, and the Arizona State Trail.

Priorities for future trail development are flexible so as to respond to property acquisition and budget availability. At this time, priorities for trail development include the following:

1. Work has begun on the North Rio de Flag Trail which includes the section from Birch Ave. at the Library to the Duck Pond and continuing to Beal Road.

2. The Observatory Mesa Trail is scheduled to begin in 1991. This trail begins at the Thorpe Park ballfields and heads up and across Observatory Mesa linking with Forest Service trails.

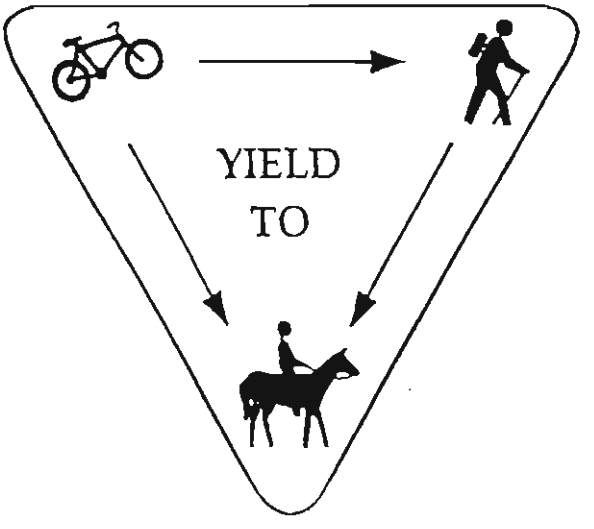
3. Completion of the NAU Sinclair Wash Link, with major pedestrian and bikeway improvements under the Interstate-17 bridge at McConnell Drive. Rustic fencing, landscaping, signage and other support facilities are proposed.

4. Sinclair Wash Trail from McConnell Dr. to University Heights, then to Fort Tuthill.

Continuing public support is necessary if this program is to be fully implemented.

Flagstaff Urban Trails System

Sharing the Trail!



4.13 BICYCLE COMMUTING

The Bicycle Federation of America, a Washington, D.C. based organization that promotes bicycling, estimates that more than 3.5 million Americans pedal their way to work on a regular basis. Those numbers are increasing but still only represent a small percentage of all commuters nationwide. It is estimated that more than half of the population lives within five miles of their work. Concern with the quality of our nation's air, the rising expense of operating automobiles, coupled with the benefit of daily exercise and easy parking, are some of the motivations.

According to a nationwide poll conducted in 1991 by Louis Harris for Bicycling Magazine, 20 percent of adults, or 32.9 million people, say they would sometimes commute to work by bicycle if there were safe bike lanes on roads. This would represent an enormous energy savings for the nation and be a great benefit for the environment. In Palo Alto and Davis, California; Eugene, Oregon; Boulder, Colorado; Madison, Wisconsin; and even downtown Manhattan, 10 percent or more of commute trips are by bicycle. Tucson, Arizona and Portland, Oregon have strategic programs to increase the percentage of bicycles in the transportation mix from 2 percent, the national average, to 5 percent. In Flagstaff many people occasionally commute by bicycle; the challenge is to promote regular bicycle commuting.

Potential bicycle commuters have many excuses for not riding to work: it's too far, the car is faster, it's too cold, work clothes will get dirty, no place to clean up, it gets dark early, or the roads are too dangerous. With proper encouragement many of these excuses can be shown to be based on misconceptions.

BENEFITS OF BIKE COMMUTING IN FLAGSTAFF

a. **Save Time** - Where the commute is under five miles, commuting by bike may actually take less time than taking a car. Delays in traffic and finding a place to park and walking the remaining distance to the work place all tend to eliminate the supposed advantage of automobile commuting. The time for a typical bike commute of 3 to 4 miles is usually 15-25 minutes, door to door.

b. **Save Money** - Bike commuters save on gas, oil and other costs of operating a car. Generally, the cost of operating a car is more than seven times the cost of a bicycle. In addition, insurance companies often charge lower rates if you don't use your car for regular commuting.

c. **Improve Health** - Bicycling is one of the best exercises for improving cardiovascular fitness. Cyclists will generally improve their health, keep their weight down, get sick less often, and arrive at work with a more positive mental attitude

d. **Improve Environment** - Choosing to bicycle instead of drive conserves oil and cuts down on environmental pollutants. Air pollution is a global health concern. Run-off of oil and gas on streets is indicated nationally as a major cause of water contamination. If Flagstaff continues to grow as an auto-dependent community, there will soon be a worse smog problem than currently exists at times, which is both a health issue and an aesthetic concern.

TIPS FOR BICYCLE COMMUTING

1. Obey all traffic regulations: ride with traffic, stop at stop signs, don't speed, etc.

2. Keep your bike in proper working condition: adjust brakes, grease chain, tighten loose parts, etc. Maintenance is an investment in safety. Carry a few basic tools.

3. Choose the best route: avoid the busiest streets, look at a map, investigate options. The best bike route to a given destination may be different than the typical auto route.

4. Wear a helmet. 80 percent of bicycle fatalities are the result of head injuries.

5. Wear comfortable clothing. Use ankle bands or clips to keep pants from getting caught or dirtied. Work clothes can be packed in panniers or bicycle mounted racks. If your work place doesn't have a locker room, use the bathroom to change. For cold weather, wear layers and gloves - remember you will heat up a little as you go. For rain, many serious cyclists wear breathable, waterproof (Gore-Tex, etc.) rainsuits, although less expensive vinyl rainsuits work too. Fenders are also helpful.

6. For night riding wear bright colors or reflective materials. Invest in a good lighting system.

7. Invest in a good lock.

8. Enjoy yourself. Discover what millions of cyclists have - transportation can be fun, healthy and economical.

RECOMMENDATIONS

1. Encourage employers to provide bicycle parking facilities, showers and locker room facilities.

2. Encourage programs to assist commuters and potential commuters with advice on bicycle maintenance, choosing routes, techniques for riding in traffic, and proper clothes to wear.

3. Sponsor ride-to-work days; offer incentives.

4. Evaluate existing and proposed routes to major employment centers. Encourage new development to include adequate on-site bicycle routes.

4.14 BICYCLES - ENERGY AND POLLUTION

THE COST OF ENERGY

In terms of energy expended per passenger mile traveled, the bicycle is the most efficient form of transportation now available. Bicycling is about three times as efficient as walking and approximately 28 times more efficient than public transit buses based on national averages for all passengers carried. The energy-efficiency of bicycling is more than 53 times that for a single-occupant automobile.

In 1991, the U.S. will purchase nearly 50 percent of the oil it needs from foreign suppliers and trends indicate this percentage is increasing. Imported oil is responsible for approximately 40 percent of this country's trade deficit. Transportation-related uses account for 72 percent of domestic oil consumption, including 63 percent for transportation and 9 percent for highway construction and maintenance. Clearly, promotion of bicycling as a means of transportation is a sound economic investment in terms of lessening dependance on foreign oil. Our economic competitors benefit from much higher levels of bicycle commuting. In Japan 15 percent of trips to work are by bicycle, 30 percent in the Netherlands, and 11 percent in what was West Germany. Per capita gasoline consumption in U.S. cities is 4.5 times greater than European cities and 10 times greater than Japan.

The United States has the highest per capita levels of car ownership. Where in the past this was thought to indicate prosperity and individual liberation, we must now consider the cost of dependency on foreign oil. Other countries will remain in a much better position to withstand the instability of oil production and prices in the future, while the U.S. economy becomes increasingly vulnerable. Per capita car ownership:

United States.....	50.0%
Europe.....	30.0%
Brazil, Mexico.....	6.0%
Thailand, Liberia	1.4%
China, India, Indonesia, Honduras.....	0.7%

It is true that the fuel efficiency of motor vehicles has increased over the past 20 years, however, the number of vehicles and the miles traveled has also increased, resulting in a net increase in the consumption of oil. Research continues in the development of alternatively-powered vehicles, such as with electric, solar and hydrogen vehicles, yet much remains to be worked out and widespread application of these technologies is not expected in the near future. Despite its advantages, the percent of Americans who commute by public transit has continued to drop over the past 30 years from 12.6% to 5%.

Solutions to this nations transportation crisis should not focus on one single solution. A variety of innovative strategies should be approached. Bicycling is only one aspect of a comprehensive transportation strategy both nationally and for Flagstaff. Continued support for public transit, promotion of ridesharing or carpooling, increased pedestrian opportunities, flexible work schedules to lower peak-hour congestion, and evaluation of land use development patterns for impact on transportation systems are some issues to be addressed.

THE COST OF POLLUTION

Each year in the U.S. as many as 60,000 people may die as a direct result of air pollution, according to studies by the EPA and the Harvard School of Public Health. It is further estimated that the annual costs of pollution in terms of human health and the environment range in the billions of dollars. Damage results to agriculture, forests, wildlife, and there is corrosion of buildings, bridges and other structures. People suffer eye irritation, cough and chest discomfort, headaches, upper respiratory illness, increased asthma attacks and reduced pulmonary function.

Although transportation is not the only contributor to air pollution, its role is substantial. Every gallon of gas consumed for vehicular travel results in the release of 19 pounds of carbon dioxide (5.3 pounds of carbon). Transportation accounts for about 31 percent of total U.S. annual carbon dioxide emissions, two-thirds of national carbon monoxide emissions, a third of hydrocarbon emissions (smog forming) and 41 percent of nitrogen oxide emissions (smog and acid rain forming). On the average, the 140 million cars in America are estimated to travel almost 4 billion miles a day and use over 200 million gallons of gas per day. On average, 4 billion pounds of carbon dioxide are released into the atmosphere each day.

Polluted run-off from roads and highways causes significant damage to this nations water quality. Toxic heavy metals (zinc, mercury, cadmium, etc.) plus oil and grease washed from roadways after rainstorms result in significant negative impacts on wetlands, watersheds, rivers, and coastal areas.

sources: *Surface Transportation Policy Project*
Bicycle Institute of America
"50 Simple Things You Can Do To Save The Earth"

4.15 FLAGSTAFF - A HIGH ALTITUDE SPORTS TRAINING CENTER

Flagstaff's relatively high altitude at greater than 7000 feet and generally clean air are beneficial for athletes involved in cardio-vascular training such as running and bicycling. The benefits of high altitude training can give the top athlete an extra edge. High altitude areas in Colorado have long been promoted as sports training centers. Flagstaff could be promoted as the high altitude sports training center of the southwest. Ibraheim Hussien, for example, winner of the Boston Marathon, relocated to Flagstaff for these reasons prior to his 1991 victory. Investment in urban amenities such as the trail system and bikeways network will contribute to Flagstaff's reputation as a sports training center. Ultimately, this could lead to greater private investment in sports facilities and sporting events.

Throughout the summer season there are at least 15 major sporting events involving bicycles. Many of these sporting events are sanctioned by national governing organizations such as the United States Cycling Federation and the National Off-Road Bicycling Association. In 1991, for example, Flagstaff was host to the NORBA - Arizona State Championships. These events attract amateurs, professionals, and collegiate athletes from throughout the state, region and nation. Additionally, the number of triathlons, biathlons, road and mountain bicycle races has been continually increasing in the Flagstaff area. In recognition of these assets and in furtherance of the promotion of Flagstaff as a high altitude training center the promoters of these events have formed an association, the Flagstaff Amateur Sports Coalition, to work towards these goals.

Sports events generate substantial economic benefits for the community, in terms of hotel, restaurant, and retail sales. Some of these events have hundreds of participants and many participants travel with their families or support teams.
Investment in bicycle facilities, both on-street and off-road, will generate long-term cost-effective benefits towards promoting Flagstaff as a major sports training and sporting events center.

5.0 EDUCATION AND PUBLIC AWARENESS

5.1 ADVOCACY

There has never been a better time to promote bicycling than now. With the current interest on health promotion and maintenance, and soaring costs to the public via increased insurance premiums and health care costs, modern businesses and community leaders should be avid cycling advocates. Add to this the need for alternative transportation methods in the face of escalating fuel costs, increasing dependence on unstable middle-east oil supplies and increasing environmental pollution, and bicycling becomes an increasingly attractive transportation choice.

Local improvements in engineering, as well as intensive educational programs will go far toward encouraging cyclists in Flagstaff. Additional promotional programs will go a long way towards ensuring cycling remains a sustainable, effective transportation choice in Flagstaff.

RECOMMENDATIONS

1. Employers should be encouraged to promote bicycle commuting as a healthy, cost-efficient form of transportation. Employers should be encouraged or required to provide bicycle parking facilities at places of employment. Providing showers for employees who commute can be considered a attractive part of an employee benefits package. Advantages to the employer in the form of healthier employees and fewer sick days could be stressed by rewarding cyclists with time off or other incentives. Local competitions for "Bike to work" days could be held with prizes for recognition for organizations with the largest percentage of participants on a given day. Bicycles could be provided by employers for short errands. Employees can advocate cycling by using the facilities provided. Employees could also hold bicycle commuting seminars to share routes, equipment etc. with fellow workers. Bike pools can be organized for those who don't want to ride alone.

2. The Tourism and Convention Bureau, Tourism Commission, and Flagstaff Chamber of Commerce should capitalize on Flagstaff's clean air and mountains by advocating our city as a destination for recreational cycling, as well as high altitude training. Brochures should be developed which include:

   a. a map of bike routes, FUTS, and other trails.

   b. safe riding information pertinent to local terrain and conditions.

   c. local laws, enforcement & registration information.

   d. local annual events and where to get more information about them,

   e. lists of bike shops, organizations and facilities.

These brochures can be distributed via the Visitor's Center, Parks and Recreation Department, Chamber of Commerce, local lodging places, bike shops, etc.

3. The City's Parks & Recreation Department is ideally set up to advocate cycling through a variety of local events. Activities could include:

a. Family ride days, which could end in a local park with refreshments and entertainment

b. Snowbiking, perhaps in conjunction with the Winter Festival.

c. Racing activities, both on and off road.

d. Sponsorship of "bike rodeos", clinics and workshops.

e. "Fall Color" tours, or similar group theme rides.

f. "Treasure Hunt" or "Scavenger Hunts" on bikes.

4. The city government of Flagstaff should set a strong and very visible example by seriously encouraging bicycle commuting among its employees. See Section 4.13 BICYCLE COMMUTING for further information on this matter.

5. The City should require new commercial and institutional developments to provide bicycle amenities such as bicycle parking for their customers and employees.

6. Public buses should have bike racks mounted to the bus to facilitate access to outlying areas as part of a multi-modal transportation strategy. Bus stops or major transportation nodes should have bike parking with racks or lockers for the same reason.

7. Co-sponsors (with the City or others) for any activity to increase public awareness of cycling in Flagstaff could include local bike shops, the NAU Cycling Club, Coconino County (Safe Kids or Heartbeat Program), public schools, private clubs, Fraternities and Sororities, service organizations, Scouts, Veterans organizations, law enforcement agencies, etc. Cycling events, such as "Pedalmania" with the American Cancer Society, have been organized by the Safe Kids Program as fund raisers and for safety promotion. All ages can be involved in cycling events. Cycling events also offer an excellent opportunity to register bikes and hand out bike safety information.

8. A citywide Bike-to-Work Day should be arranged to promote bicycle commuting.

5.2 EDUCATION

Educational needs exist for motorists and cyclists of all ages, particularly in view of the expanding role of bikes in local traffic patterns. Some of these needs are met by current programs, however, additional educational opportunities should be developed.

A survey undertaken by this committee showed that 62% of respondents considered education of cyclists, as to safety and regulations, to be a priority. 31% of the respondents supported bike safety programs. 34% include education of motorists as a priority.

National injury statistics showed that in 1988-1990, Arizona led the nation in bicycle fatalities as a percentage of population. This is not a statistic of which we can be proud. (Arizona's bicycle fatality rate is approximately 1 in 100,000). Nationally, in 1990, there were 860 bicycle fatalities and over 1/2 million bicycle related injuries were treated in hospital emergency rooms. Locally, the Police Department estimates the average age for bicyclists involved in accidents is 20; 19% involved 6-12 year olds.

Statistics from Flagstaff Medical Center show that from 1988-1990 there were 505 bike-related injuries; 457 persons were treated as outpatients and 48 were treated as inpatients. Unreported injuries and those treated in physicians offices are unknown.

Existing bicycle safety programs have mainly focused on elementary age children. The "Safe Kid's" program is a five year federal grant funded program sponsored by the Coconino Department of Public Health to promote bicycle safety for children. They have been instrumental in organizing a Bicycle Safety Task Force to promote helmet use and safety education. They focus mainly on 3rd to 6th graders and work through the Public School Districts, offering educational materials, information, and special presentations.

"Safe Kids" has worked with the Flagstaff Police Department, City Recreation Division, and local bike shops to sponsor the "Bicycle Safety Program", a two hour event held at the Ice Rink in June of 1990 and 1991, to promote safety and registration. Approximately 300 children participated at each event, using their own bicycles to negotiate a skills course. They also completed a safety quiz. Certificates, helmets and prizes were awarded and safety literature was distributed.

The Flagstaff School District has offered one bike related class which was on maintenance in the past three years. The class was offered in the fall of 1990, but was canceled for lack of participants.

Flagstaff Public Schools enrolled 11,589 students as of Spring 1991.

K - 6th	6,615
7th - 8th	1,748
9th - 12th	3,226

Bicycle education is not included as a part of the curriculum in Physical Education and is mentioned only at the instructor's discretion in general health and safety, according to Dr. Chris Peterson, Safety Director of Flagstaff Public Schools. Principals at individual schools usually include bicycling information during orientation but it is generally limited to parking, etc. Individual school rules vary, eg., DeMiguel does not allow students below the 4th grade to cycle to school for safety reasons, although the precise safety reason is not indicated. These individual policies should be evaluated for possible input and mitigation from various city departments.

Safe Kids has done surveys on helmet use of 4th through 6th grades in five schools. In 1989, 91% of the students reported having ridden their bikes to school, but only 3% wore helmets. In 1990, after the Safe Kids bike campaign, helmet use increased to 9%. A survey will be completed in May 1991. A study published in the June 1990 Journal of Family Practice, by Kimmel and Nagel, found that injuries occurred more than twice as often (19% vs. 9%) to children who have not received bicycle safety instruction.

NAU provides a brochure of campus bicycle regulations, policies, and recommended routes at the time of registration. Members of the NAU Cycling Club have given talks to 3rd - 6th graders at local elementary schools in conjunction with the "Safe Kids Program". Several events are planned each spring to promote cycling.

Local bike shops have offered cycling classes in the past, for a fee, as well as offering public service such as "Bicycle Tips" at the City Bicycle Safety Program. The Flagstaff Police Department provides a copy of local laws and regulations on request. Some safety educational materials (coloring books and bookmarks) are given to children when they register their bikes. At present no city map is available to the public indicating bike routes.

The U.S. Forest Service provides the "Sharing the Trail" brochure with information on proper use of multipurpose trails by bikers, hikers, horseback riders and joggers.

SAFETY STATISTICS

source: National Highway Traffic Safety Administration.

- Bicyclists and pedestrians account for almost 20 percent of all traffic-related fatalities; and more than half of all such fatalities in urban areas.
- An average of 7000 pedestrians are killed by motor vehicles each year in the U.S.
- More than half of all bicyclists deaths occur to school age children (ages 5-17). Males account for more than 80 percent of the fatalities.
- Most non-fatal bicyclist injuries do not involve collisions with motor vehicles. More than half of these injuries involve hitting the roadway and similar spills.
- Most fatal injuries to bicyclists (about 90 percent) involve collisions with motor vehicles.

- Head injuries are the cause of over 80 percent of bicycle rider deaths; less than 5 percent of U.S. bicycle riders wear helmets.

- Although the regular use of bicycles by Americans has almost tripled over the past 15 years, fatality and injury rates have shown a slight drop in overall numbers. In terms of actual numbers this represents a significant increase in the safety rating for bicycling over this period. In 1980, there were 965 fatalities and 575,000 injuries; in 1989, there were 821 fatalities and 514,700 injuries. It should be noted that there has been a great increase in the number of bicycle education and safety programs introduced during this period, as well as major investment in new and upgraded bicycle facilities in many locations throughout the U.S.

- Nationally, the responsibility for serious injury producing bicycle/motor vehicle crashes is related to age. Through age 12, the bicycle rider tends to be at fault. The probable responsibility decreases according to age, with only about one-third of bicyclists age 25 and older responsible for their crashes with motor vehicles.

RECOMMENDATIONS

1. Community specific bike safety and information packets should be distributed with each new bike sold. This should include information on regulations and laws, and maps of local routes.

2. A Bicycle Safety Program could be established at neighborhood parks and recreation centers throughout the summer. Perhaps shopping malls could be used during the winter months as this would also target adults. This program could include:

   a. A traveling "safety town" and skill station.

   b. Bicycle registration.

   c. Bicycle safety and information packets to be distributed.

3. Include cycling as part of the physical education curriculum at all levels in the school system, including colleges.

   a. Parent-Teacher organizations may be approached to donate bicycles and helmets.

   b. Effective Cycling techniques for personal fitness, efficiency training programs, and increased safety could be included.

   c. NAU and community colleges should be encouraged to offer cycling courses for credit.

4. Work with local merchants to offer discounts on bikes and related items such as helmets in exchange for participation in safety education programs.

5. Offer bike classes as alternatives to fines for bicycle violations.

6. Use local events as an opportunity for education. These programs should also be geared toward adults, including motorists and their responsibility for sharing the road with cyclists.

7. Cycling education should be included in Drivers Education classes in the public schools. It should also be included in mandatory DUI classes.

8. Make educators in the public and community school systems aware of resources such as the League of American Wheelmen, Safe Kids, Cycling clubs, Arizona Bike - Ed, etc. Some programs will train local instructors, provide videos, etc.

9. Sponsor periodic mass media campaigns to publicize safety tips for cyclists and motorists. This could include:

a. Newspaper ads & public service announcements, brochures and posters.

b. Information that can be sent home with school children (directed at adults as well as children).

c. Information to be included with city mailings and distributed to city employees.

10. Encourage the inclusion of cycling rules in the State Drivers License Testing.

11. Explore alternate sources for dissemination of safety education such as the Library, Chamber of Commerce, FMC Emergency department, Physicians offices, School Nurses, Coconino County Health department, employers, Coconino National Forest offices, City Hall, NAU, etc.

12. Develop a Hazard Reporting System to rapidly identify and correct situations which are dangerous to cyclists, such as grates and potholes. This activity could be included with maintenance of bikeways or with a new bicycle-related staff position. Publicize the phone number to use for this service.

13. There is the possibility of "recycling" unclaimed bikes from the Police Department to schools for PE or other use instead of auctioning them off. They could also be used by tourists or others for free transportation around town.

14. Encourage print and television media to portray pictures of bicyclists wearing helmets. Monitor and respond to media images of unsafe or illegal bicycle operation.

5.3 ENFORCEMENT

Enforcement of bicycle laws is a function of the Flagstaff Police Department. In the past, few violators have been cited. Chapter 28-12 of the Arizona Motor Vehicle Statutes applies to bicyclists, as does chapter 5 of the City Code. Fines are the same as those for motor vehicles, except that under current law it is not illegal to operate a bicycle while intoxicated. Per City Code, juveniles under the age of 14 cannot be cited although parents may be contacted and the juvenile given a warning.

The Flagstaff Police Department conducts periodic enforcement campaigns. The Police Department works with the courts and the judges to enforce the penalties of any violations. Police on bicycles patrol problem areas, including Downtown, near NAU, and areas around schools and parks. Northern Arizona University also has placed campus police on bike patrols for much the same reasons. Violations to be targeted include stop sign violations, speeding, wrong way riding, and sidewalk riding violations. An associated publicity campaign should precede stepped up periods of enforcement. Enforcement programs with related publicity should be considered for the Fall, when students return to school, and in the Spring when the bicycle use increases after the warmer weather returns.

The goal of enforcement should be to affect behavior and attitude changes among cyclists and motorists in a positive way. It should not be solely a revenue producing resource for the city. Enforcement should be seen in a caring and preventative light rather than an aggressive or negative attitude toward bicyclists.

Bicycle Survey results showed that 48% of the survey respondents felt we should enforce traffic laws for bicyclists as well as motorists. 70% of non-cyclists see enforcement of laws on bikes as a top priority.

RECOMMENDATIONS

1. Evaluate carefully the Flagstaff Police Department enforcement program and continue periodic enforcement campaigns if it proves successful in decreasing accidents, complaints, and illegal behavior, and increasing public awareness.

    a. Continue and expand Police Bike Patrol if it proves effective.

    b. Spring and the beginning of each semester at NAU should be prime times for enforcement campaigns.

    c. Warning tickets and verbal warnings should be the first step for most violations.

    d. Penalties for serious violations should be consistent and appropriate for all moving vehicles.

2. Maximum publicity should be given prior to enforcement periods, with ongoing education of adults and children as to local rules and responsibilities.

a. The City should fund notices or advertisements in local newspapers, if necessary.

b. Press releases should be prepared for all local media concerning enforcement program and regulations for bicyclists and motorists.

3. Classes on bicycle safety should be offered as an alternative to fines for serious citations. These classes could be offered on a periodic basis by trained and certified City staff or volunteers. This approach has proven very successful and cost-effective in other jurisdictions and is worthy of serious consideration.

4. Warnings should be given to parents of children under the age of 14 who cannot be cited. This can be used as an opportunity for adult and child education. Some departments require the warning to be signed by the parents and returned to the Police Department.

5. The Police Department should have one officer who is charged with making an enforcement program succeed. He or she should participate in local bicycle committees and commissions and be trained as a resource person for the community and other officers.

6. Continue efforts to educate and publicize local laws and regulations through brochures, media campaigns, etc.

7. Encourage the State of Arizona to include questions on bicycle regulations on State Driver's License tests.

8. A Bicycle Monitor program could be considered to supplement the Police Department's efforts. Voluntary monitors serve in educational as well as enforcement roles and can help with first aid and minor repairs. Typically, established bike clubs become involved with this type of activity, and extensive training and certification is required. These types of programs have been especially effective in parks and on recreational trails, but could be considered city-wide. The City could provide some equipment or training.

5.4 REGISTRATION

Chapter 5, Sections 9-5-8 through 9-5-12, of the Flagstaff City Code deals with the requirement that bicycles used in the city be registered and licensed locally. According to the City Code, the City Clerk is responsible for issuing bicycle licenses, providing tags, and collecting fees which are paid into the City general fund. The Chief of Police is empowered to administer and enforce the provisions of this chapter.

Under the present system, to meet this requirement, a citizen must go to the Police Department downtown between 8-4:30, Monday through Friday with their bicycle. An employee will complete an application form which includes personal data on the owner and a description of the bike including the manufacturer's serial number from the frame. After paying a fee of $1.00, the applicant is given a copy of the receipt indicating the registration number which he or she is instructed to keep in a safe place. A sticker bearing the number is affixed to the seat post bar of the frame. No safety inspection is performed.

The Police Department forwards its copy of the receipt, the application, and money to City Hall where the information is entered into a computer for reference. If complete, the information is also entered into a nationwide computer data bank. Computerized records are available at the Police Records Department for bicycle registration dating back to 1960. Information can be retrieved numerically by registration number or alphabetically by owner name.

In 1988, sixty-six bicycles were registered. In 1989, sixteen were shown as registered. In the Spring of 1990, the Arizona Board of Regents for the three state Universities began to require on-campus bicycle registration. Northern Arizona University has complied with this requirement by cooperating with the Flagstaff Police Department's city registration. At the time students register for school, they are required to register their bikes. Consequently there was a large increase in the number of bicycles registered in Flagstaff in 1990, to 1,327.

An advantage of bicycle registration to the citizen is that it facilitates the return of stolen bicycles recovered by the police. In 1990 two hundred and twenty-seven bicycles were reported stolen in Flagstaff. NAU reported 138 bicycles stolen in 1989, and 139 campus bicycle thefts in 1990. In addition, return of recovered bicycles minimizes the storage space required to hold them prior to periodic auctions.

Another advantage of registration is that it aids in identifying accident victims who may not be carrying identification, especially children. In addition, the registration process offers an excellent opportunity for distributing safety and regulatory information, especially to adults.

Additionally, registration can be a revenue source for bicycle programs. At $1.00 per bicycle, the city received over $1,300 dollars in 1990. Thousands of new bicycles are sold each year in Flagstaff. If bike shops were offered an incentive for participating in a registration program, it is possible that thousands of dollars could be raised for bicycle programs. At the least the program could help finance the production of route maps, event schedules, safety and maintenance information, or special events. Other cities charge between three and five dollars for adults. If the fee is increased, the amount should be not be prohibitively expensive, thereby decreasing compliance. Further evaluation should be given to the fee structure if the program is expanded. Rates for children could be lower than rates for adults.

RECOMMENDATIONS

1. Continue the current registration system as a one time event, with the fee remaining at $1.00. This may not cover the costs of the program but could supplement expenses until the program is expanded.

2. Consider increasing the fee in the future, in connection with a comprehensive program, including increased bike facilities, and associated education and publicity.

3. Omit the $0.50 fee for "transfer of registration at time of change in ownership" from the City Code. Include instructions for same in registration materials.

4. Expand the registration sites to include City Fire Stations, bicycling events, schools (after hours), Parks and Recreation, etc. with registration remaining the responsibility of city employees for the present.

5. Use registration as an opportunity to distribute educational material to both adults and children. It should include:

City Ordinances
Maps/Route information
safe riding practice/helmet use
Motorist roles and relationships
Bicycle maintenance and operation information
Special event schedules
Contacts for related City services
Info on organizations and clubs

6. Have periodic publicity programs by the city regarding the advantages of registration such as flyers posted, media announcements, annual drive, etc. This can be tied into a Bike-to-Work program or activity.

7. Utilize volunteers under city employee supervision to disperse publicity materials and/or assist with registration.

8. Establish a system for bicycle registration fees to go into a special fund for bike-related expenditures only, with the understanding that this is not the only source for city bike funds.

9. Consider establishment of a Bicycle Commission or a designated employee to oversee spending of the above fund and to provide direction on other bicycle program expenditures.

10. If the program is expanded, consider a mechanism of enforcement for non-registration, such as a fine or mandatory class attendance.

6.0 IMPLEMENTATION

6.1 IMPLEMENTATION STRATEGY

A comprehensive bicycle program for the City of Flagstaff should include the 4E's: education, enforcement, encouragement and engineering. All aspects of the bicycle program should be evaluated and prioritized based on effectiveness towards the comprehensive program.

This section is meant to provide general examples of types of projects. Individual project costs may vary widely. Grants may be available for some projects listed as examples. Other factors should be considered, such as life-cycle costs, safety concerns, coordination with other projects, and community goals. The projects are grouped (in general terms) in the following manner: Low Cost Projects (less than $10,000); Medium Cost Projects ($10,000 - $25,000); High Cost Projects ($25,000 or greater).

LOW COST PROJECTS

Installation of signed routes is a relatively low cost measure resulting in a high degree of return. Some existing bike routes, including paths, lanes and shared roads, have been designated in the plan, yet are inadequately marked in the field. Assessment, standardization and installation of a city-wide bikeway signage system on all existing and proposed bike routes should be considered as a low cost, high impact project. Include numbered or named routes. Install destination and distance signs.

A number of streets, as listed in the route recommendations, could receive striped bike lanes basically for the cost of the painted lines. This may involve restricting parking on-street and some minor construction elements so as to provide continuity to the system. The principal cost would be staff time for design, installation and coordination.

Install additional bicycle parking racks downtown and at other activity centers.

Designate a staff person as a part time Bicycle Coordinator. Create and staff a Bicycle Commission.

MEDIUM COST PROJECTS

Maintenance of bicycle facilities would go along way towards improving the system. A regular program for clearing snow and sweeping cinders may require some additional equipment and designation of personnel for the work effort.

Install bicycle activated mechanisms at traffic signals, such as buttons accessible from on-street lanes and pavement loop detectors.

Production of maps or brochures would be beneficial for visitors, as well as residents. Professional graphic design should be utilized in the production of map/brochure. Indicate FUTS, Forest Service trails, and city bikeways.

Minor construction projects to provide continuity to the system. May involve paving shoulder of roadway, curb cuts, widening path at intersection, or short sections of connecting path.

Establish bicycle education programs. This may include publications, special events, or classes for traffic violations. Establish and coordinate vehicle trip reduction programs, such as rideshare and bicycle commuting advocacy.

Hiring or designating a part-time Bicycle Coordinator may include salary and program management costs.

HIGH COST PROJECTS

Construction of new paths and inclusion of adequate right-of-way for on-street bike lanes are examples of high cost projects. This level of commitment is necessary in the long run if Flagstaff is to have an effective, fully functioning bikeway network.

Construct bicycle/pedestrian bridge or tunnel crossings across the railroad.

Pave heavily used sections of the FUTS trail for greater emphasis as a component of the bicycle transportation network.

Establish comprehensive education and advocacy program.

Hire or designate a full time Bicycle Coordinator. If the coordinator is able to obtain grants and more effectively manage the City's bicycle program, the investment could prove cost effective.

6.2 STRATEGY FOR FUNDING

There are several sources for funding of bikeway projects/facilities. These can be broken down into four major categories: 1) Federal sources; 2) State sources; 3) Local sources; and 4) Private sources.

FEDERAL SOURCES

Federal-Aid Highway Program.
Typically, federal funds for bicycle projects are controlled by the state. The eligibility criteria is weighted towards entitlement cities and metropolitan planning organizations (populations greater than 50,000). The 1991 reauthorization of the Surface Transportation Assistance Act may change the following information and the final outcome of the 1991 federal highway bill should be closely evaluated. Unfortunately, however, it is anticipated that the 1991 reauthorization of the federal transportation program will continue policies weighted towards new highway construction, with minimal funding available for bicycle programs.

Hopefully, our national and state transportation policies will someday place greater emphasis on alternate modes, such as walking, bicycling and transit. A percentage of state and federal allocations should be mandated for pedestrian and bicycle projects. Continued efforts should be brought to bear on state and federal representatives until bicycling receives its fair share of transportation funding. A common misconception maintains that cars and trucks pay their own way. Road taxes and licensing fees pay for only about 1/3 of the costs of highway construction. The federal subsidy for each private automobile is estimated at more than $2,000 per year, and the overall impact on the economy is staggering. This does not include other direct and indirect costs, such as public safety services, taxable land dedicated for right-of-way, air pollution, lost time waiting in traffic, accidents and death.

Currently, federal funds for projects and facilities are available from a variety of sources. Title 23, United States Code (USC), Section 217 allows the use of Federal-Aid highway funds for bicycle and pedestrian projects. Incidental, independent and non-construction bicycle projects must be principally for transportation rather than recreation. Incidental bicycle projects forming parts of larger highway works may be funded at the level of federal participation in the related highway construction. Independent bicycle projects (i.e. a bicycle facility constructed independently from a highway project and primarily used by bicyclists) may be 100% federally funded. Non-construction projects include educational materials and route maps.

There an annual limit of $45 million set for the amount of federal aid highway money that can be spent nationally on independent and non-construction bicycle projects. Each state has a limit of $4.5 million. However, this is not a separate fund just for bicycle projects. The state must decide to carry out these projects, rather than other projects for which federal-aid highway money would be available. In other words, bicycle project funding competes with highway funding. Nationally, in 1990, less than 3.3 percent of funds potentially available for bicycle projects were utilized for such. This is only a tiny fraction of the billions of dollars spent each year in the federal transportation budget. The mechanisms and formulas for federal funding will probably be somewhat modified by the 1991 reauthorization of the Surface Transportation Assistance Act, and this should be closely evaluated.

Urban Mass Transportation Funds.
The Urban Mass Transportation Act of 1964 also provides federal funds to provide access for bicycles to mass transportation facilities, to provide shelters for and parking facilities in and around mass transportation facilities, or to install racks or other equipment for transporting bicycles on mass transportation vehicles. These funds are generally geared towards major metropolitan areas.

Highway Safety Grants.
Federal funds are also available for bicycle safety programs through Title 23, USC 402, the State and Community Highway Safety Grant Program. These funds require a statewide plan for the use of these funds. Each state has a Highway Safety Representative (AZ DPS) who has influence over allocation of these funds.

United States Forest Service
A variety of federal funding sources are available for trail and recreational development. Biking on trails has become increasingly popular in the Flagstaff area. The City should coordinate with the Forest Service for trail and trailhead development, signage, and educational programs.

Other Programs.
Rail-trail conversions may include a level of federal funding. There are no known railroad alignments in Flagstaff that would qualify at this time for conversion to trail use. Contact the Rails to Trails Conservancy for further information.

Other federal agencies may have bicycle related grant programs or information available. The U.S.Department of Transportation and the Federal Highway Administration each have full time bicycle coordinators. The EPA, the Energy Department, and the Interior Department have bicycle related study programs.

STATE SOURCES

ADOT
The Arizona Department of Transportation (ADOT) has jurisdiction over a number of major roadways within the City of Flagstaff, such as, Santa Fe Avenue, Fort Valley Road, Highways 66 & 89, and two major interstates. All projects under ADOT jurisdiction should be evaluated in terms of bicycle accessibility. It is up to the City staff and elected officials to encourage, pressure or force ADOT to include bicycle and pedestrian facilities in their projects in Flagstaff.

Heritage Fund.
The Heritage Fund is one source of State funding that can be used for bikeway facilities, especially to provide public access to recreational developments. Competition will be keen for these funds within the State. Application may be for funding of separate bikeway projects or more comprehensive project applications may include a bikeway component. All City involvement in Heritage Fund applications should be evaluated in terms of bikeway objectives.

Percentage of Funds.
The State of Oregon has enacted legislation (ORS 366.514) that requires that no less than 1% of the State Highway Fund each year be spent by cities, counties and the state for bikeways and footpaths. Support should be given for an Arizona law to require a specified percentage of funding for bicycle and pedestrian related projects.

NAU
The University has the ability to include on-campus bikeway development in their capital improvements budget. Northern Arizona University should be encouraged to construct their portion of the city-wide bikeway system. There are numerous potential routes through the campus. The City should coordinate off-campus connecting routes.

LOCAL SOURCES

General Fund.
At present, the City of Flagstaff appropriates funds for bikeways within the Capital Improvements Budget. Bikeways are included in the Street Construction and Reconstruction program. Funding should continue through the Capital Improvements Program, as bicycles are a legitimate and cost-effective component of the city's transportation system.

Bond Projects.
The 1988 Street Improvement Bond Program, as approved by the voters, includes bike lanes on most projects. Cedar Avenue, Butler Avenue, Sixth Avenue, Lake Mary Road, and Lone Tree Road are bond projects that include bikeway facilities. Separate bikeway projects could be proposed through bond financing. Future bond proposals, including park, school, or airport bonds, should be evaluated for inclusion of bikeway features.

Right-of-Way Projects.
Consideration should be given to bicycle facilities as parts of sewer line improvements, buried utility line projects, stream channelization projects, and any other projects that entail right-of-way work. The Rio de Flag flood control project should include trails and recreational opportunities as part of a multi-objective approach to work in this area.

BBB Funds.
Other potential sources of local funding include the Bed, Board and Booze Tax (BBB). After hiking and walking, bicycling is the second most popular recreational activity in Arizona. Recreational tourism is a well documented aspect of the tourism industry. Sporting events also attract visitors. The criteria and eligibility for BBB funds is well met by investment in bicycle related promotions and facility development.

Registration Fees.
Fees should at least pay for program costs. If the program is adequately promoted, additional revenue raised should be used for bicycle related expenses, such as educational material. If the fee is increased from $1 to $3 or possibly $5, and registration is promoted for new sales, there may be a significant amount of revenue available.

Traffic Fines.
Enforcement of traffic violations will benefit the safety of cyclists as well as motorists. Revenue collected above estimated program costs should be used for bicycle education programs.

PRIVATE SOURCES

Private Donation.
Cash donations from private firms and/or individuals can be accepted, however, historically, these have been limited. Voluntary right-of-way dedications or access easements should be sought when applicable to approved or adopted plans and policies.

Private Development Zoning.
The Zoning Code can be used to require the inclusion of bicycle facilities as a condition of development. Rezonings, annexations, subdivisions and conditional use permits should include requirements to address bicycle and pedestrian access. Bicycle parking facilities should be required for commercial, institutional and public facility development. Traffic impact analysis should include mitigation of impacts to the bikeway system.

Volunteer Maintenance
Adopt-A-Path or Adopt-A-Bikeway programs could be utilized for spot maintenance. Businesses, organizations or individuals could be designated as caretakers of sections of bikeway routes.

RECOMMENDATIONS

1. For private and public development, right-of-way dedication and/or easements should be provided where necessary, for continuation of on-and off-street bikeways designated by the bikeway plan (from Growth Management Guide 2000).

2. In all new developments in urban areas, linkages should be provided for pedestrian and bikeway access into the City's existing and planned pedestrian bikeway system (from Growth Management Guide 2000).

3. In any new developments, bicycle facilities and bicycle support facilities should be included in the design of new developments.

4. On all Street Bond Programs in the future, ensure that not less than 3% of street improvement project funds are earmarked for bikeway facilities.

5. Evaluate all proposed City bond programs for inclusion of bikeway objectives.

6. All Capital Improvement Program projects involving work in any City right-of-way should be evaluated for inclusion of bikeway objectives.

7. Identify potential incidental and independent bicycle projects and pursue Federal bikeway funds through Title 23 USC 217 for these projects.

8. Identify the need and pursue Federal bikeway safety funds through Title 23 USC 402 procedures. Coordinate the needs for the use of the funds locally with a Statewide plan for the use of the funds.

9. Identify the need and pursue available funds through the Urban Transportation Act to provide bicycle support facilities to mass transportation facilities.

10. Pursue U.S. Forest Service Challenge/Cost Share funds in coordination of activities between the City and the Forest Service.

11. Look for opportunities to combine bikeway projects into local Heritage Fund proposals to increase the likelihood of selection of projects to be funded by the Heritage Fund.

12. Promote the passage of a federal or state law similar to ORS 366.514 that would specify a minimum amount of the State Highway Fund to be spent on bikeways.

13. Explore the possibility of funding bikeway projects through the use of BBB funds. Coordinate with other BBB funding projects for the inclusion of bikeway facilities and bikeway support facilities where appropriate.

7.0 APPENDICES

7.1 Bikeways Committee Resolution

7.2 Bicycle System Maps

A-1 Flagstaff Bikeways System
A-2 Flagstaff Urban Trail System
A-3 NAU Bicycle Circulation Concept Map

7.3 Survey Results:

B-1 Survey Form
B-2 Survey Returns by Area
B-3 Summary of Survey Returns
B-4 Bicycle Ridership by Age
B-5 Bicycles per Home
B-6 Need for More Bicycle Paths/Lanes
B-7 Four Most Needed Improvements
B-8 Where Bike Paths/Lanes Needed
B-9 Types of Use
B-10 Helmet Use

C-1 Visual Bicycle Traffic Survey

D-1 Bicycle Accidents (reported to Police Department)
D-2 Bicycle Thefts (reported to Police Department)

7.4 Summary of Comments from Survey

7.5 Survey Preparation and Methodology

RESOLUTION NO. 1667

A RESOLUTION ESTABLISHING AN AD HOC COMMITTEE TO REVIEW AND RECOMMEND REVISIONS TO THE EXISTING AND PROPOSED PLANS, PROGRAMS, AND FACILITIES SO AS TO UPGRADE, IMPROVE AND EXPAND THE BICYCLE PATH SYSTEM OF FLAGSTAFF.

WHEREAS, numerous citizens have expressed their interest in and desire for improvement in the paths designated for the use of bicycles; and

WHEREAS, the City Traffic Commission has recommended the formation of an Ad Hoc Bikeways Committee; and

WHEREAS, the use of bicycles for transportation and recreation has continuted to increase throughout the years; and

WHEREAS, it has been ten years since a comprehensive City-wide study was done for a bicycle path system; and

WHEREAS, this Council deems that a judicious use of paths and routes for bicycles would benefit the health and safety of the residents of Flagstaff; and

WHEREAS, there are residents of this City ready and willing to investigate, prepare and recommend plans and improvements for the bicycle circulation system;

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF FLAGSTAFF AS FOLLOWS:

SECTION 1: That a Committee be, and hereby is, established, to be known as the Ad Hoc Bikeways Committee.

SECTION 2: Membership of said Committee shall consist of nine voting members to include, one City Council person, one representative of the Traffic Commission and seven members-at-large to be appointed on the basis of diversification in background and representative of a variety of interests; in addition, there shall be appointed from various City departments, one member each in an advisory capacity, to include Planning, Engineering, Public Works, Parks and Recreation, and Police Department.

SECTION 3: Said Committee shall appoint a Chairperson and Vice Chairperson who will determine the meeting times and dates of the Committee.

SECTION 4: The Committee, upon appointment, shall organize forthwith and determine a course of action which will result in specific recommendations for Council action with regard to bikeways development and improvement throughout the City. Their work program shall include ample opportunity for public input and shall include evaluation and recommendations to be produced as a report to include at least:

A. Physical data inventory needs and assessments for bikeways;

B. Bicycle user data characteristics;

C. Bicycle path development and program funding;

D. Bicycle education, publicity and advocacy programs;

E. Update bikeways sub-element of Growth Management Guide 2000;

F. Evaluate related plans and progams for coordination with bikeways objectives and implementation.

SECTION 5: In the absence of further extension by the City Council, this Committee, and the appointments thereto, shall cease to exist as of one hundred and eighty (180) days from the effective date of this Resolution.

SECTION 6: The City Manager is directed to provide reasonable staff assistance and funding of necessary expenses for the Committee.

PASSED AND ADOPTED by the Council and approved by the Mayor of the City of Flagstaff, this 15th day of May, 1990.

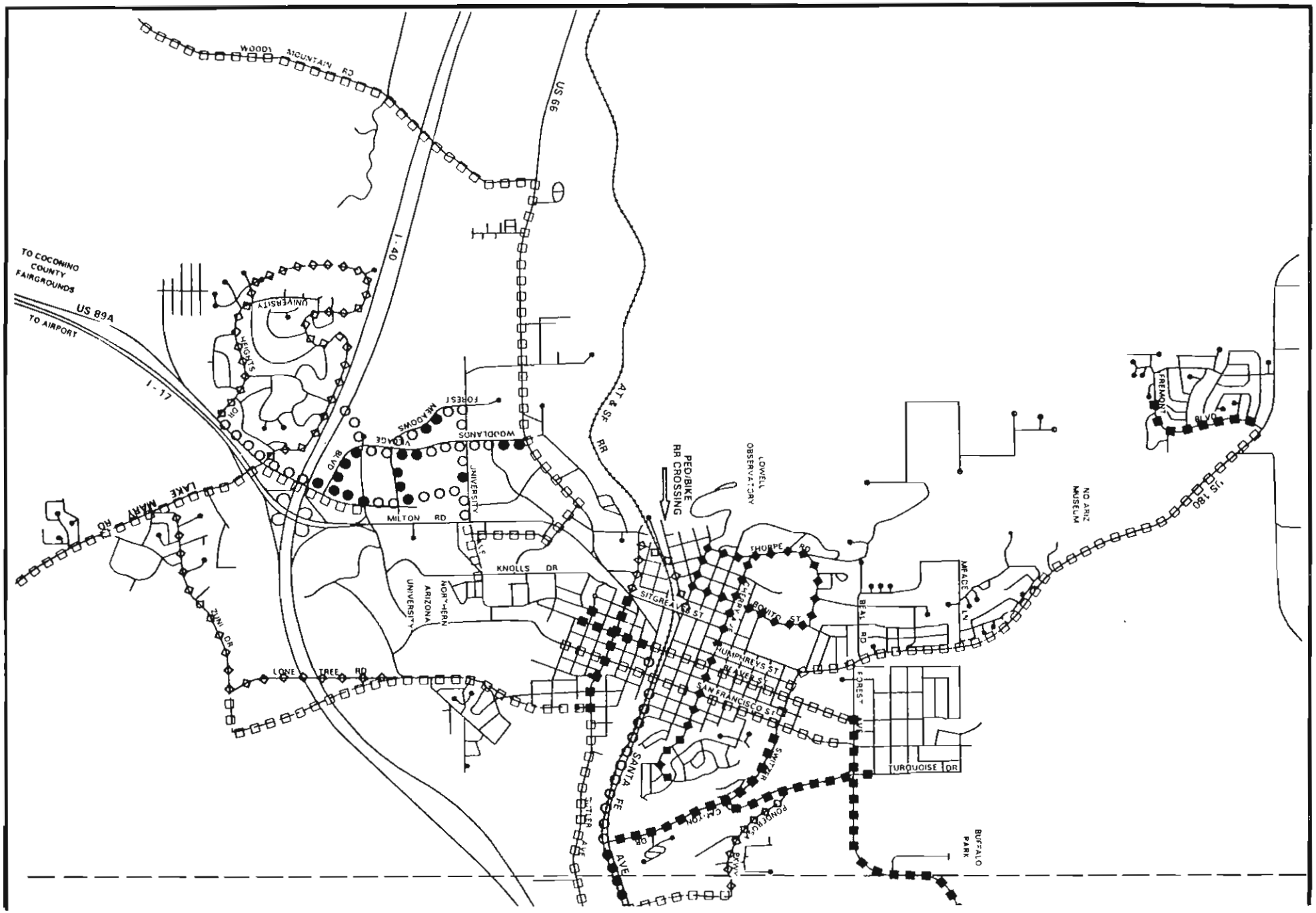
MAYOR

ATTEST:

CITY CLERK

APPROVED AS TO FORM:

CITY ATTORNEY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I-17
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FOREST MEADOWS VILLAGE BLVD
WOODLANDS
UNIVERSITY
MILTON RD
LAKE MARY RD
KNOLLS DR
UNIVERSITY
ARIZONA
NORTHERN
PED/BIKE RR CROSSING
LOWELL OBSERVATORY
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BONITO ST
HUMPHREYS ST
BEAVER ST
SAN FRANCISCO ST
SANTA FE AVE
SWITZER CANYON DR
PONDEROSA PKWY
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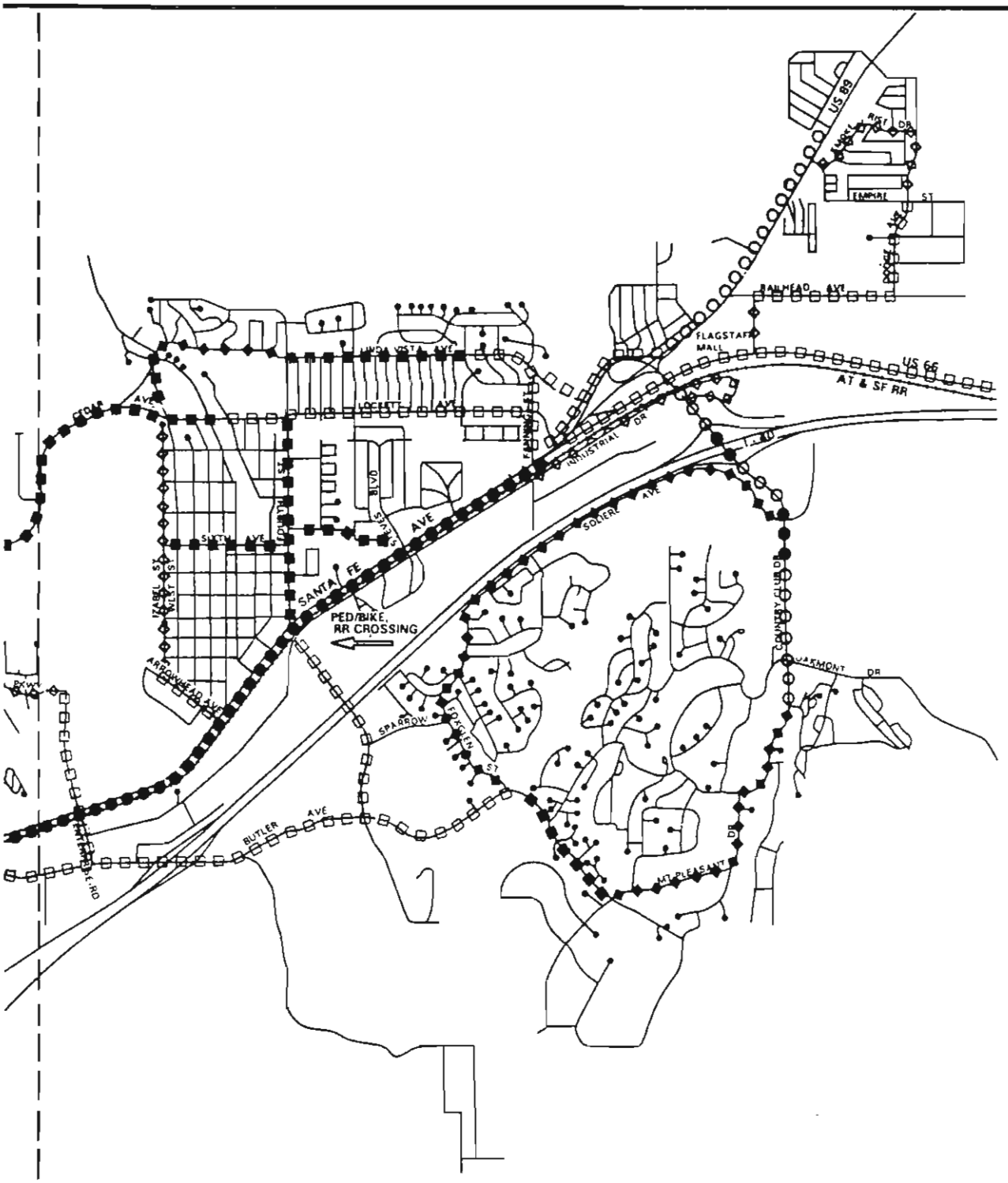


BIKEWAYS

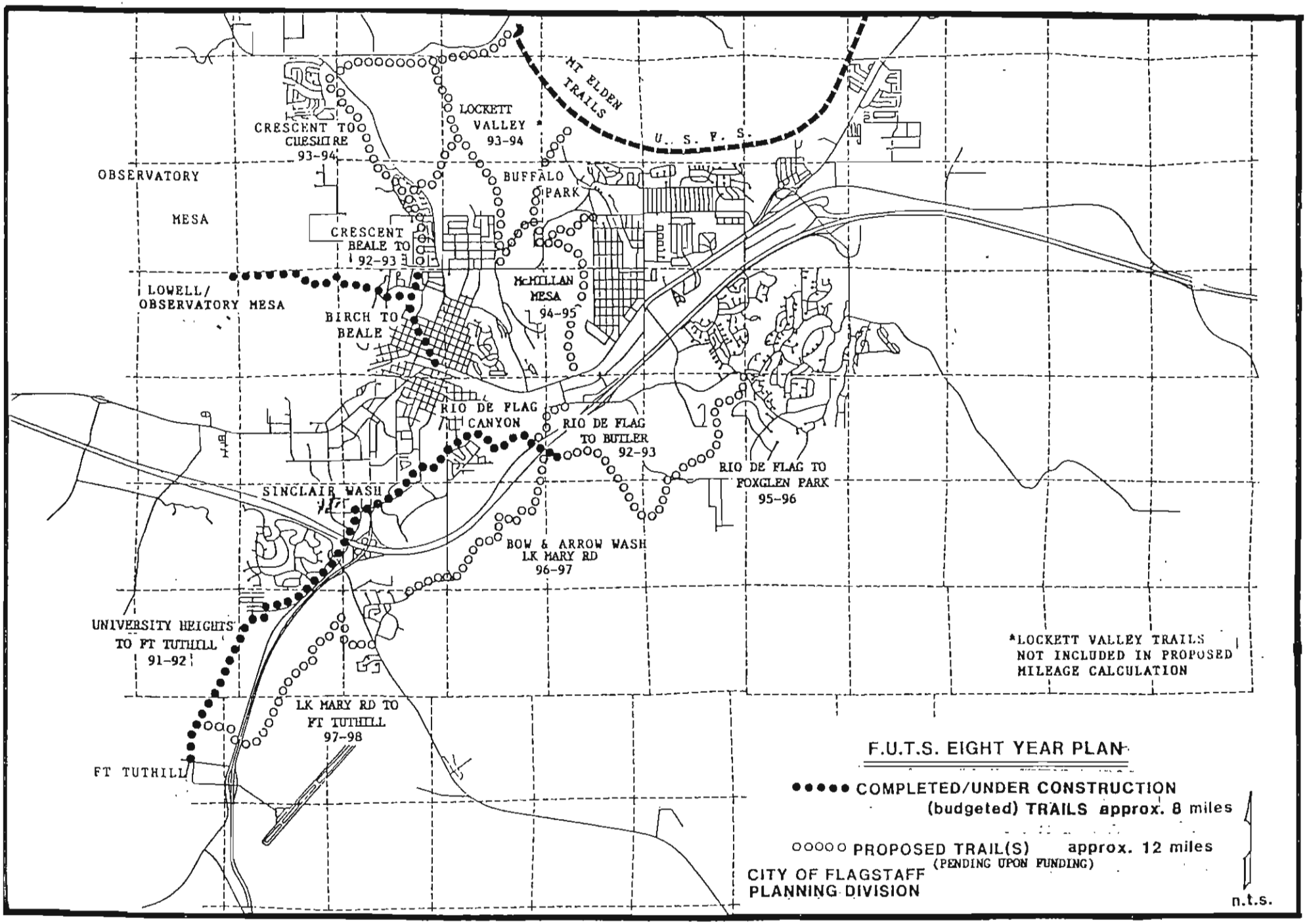
	EXISTING	PROPOSED
TYPE I PATH	●●●●●●	○○○○○○
TYPE II LANE	■■■■■	□□□□□
TYPE III SHARED ROADWAY	◆◆◆◆◆	◇◇◇◇◇

NORTH

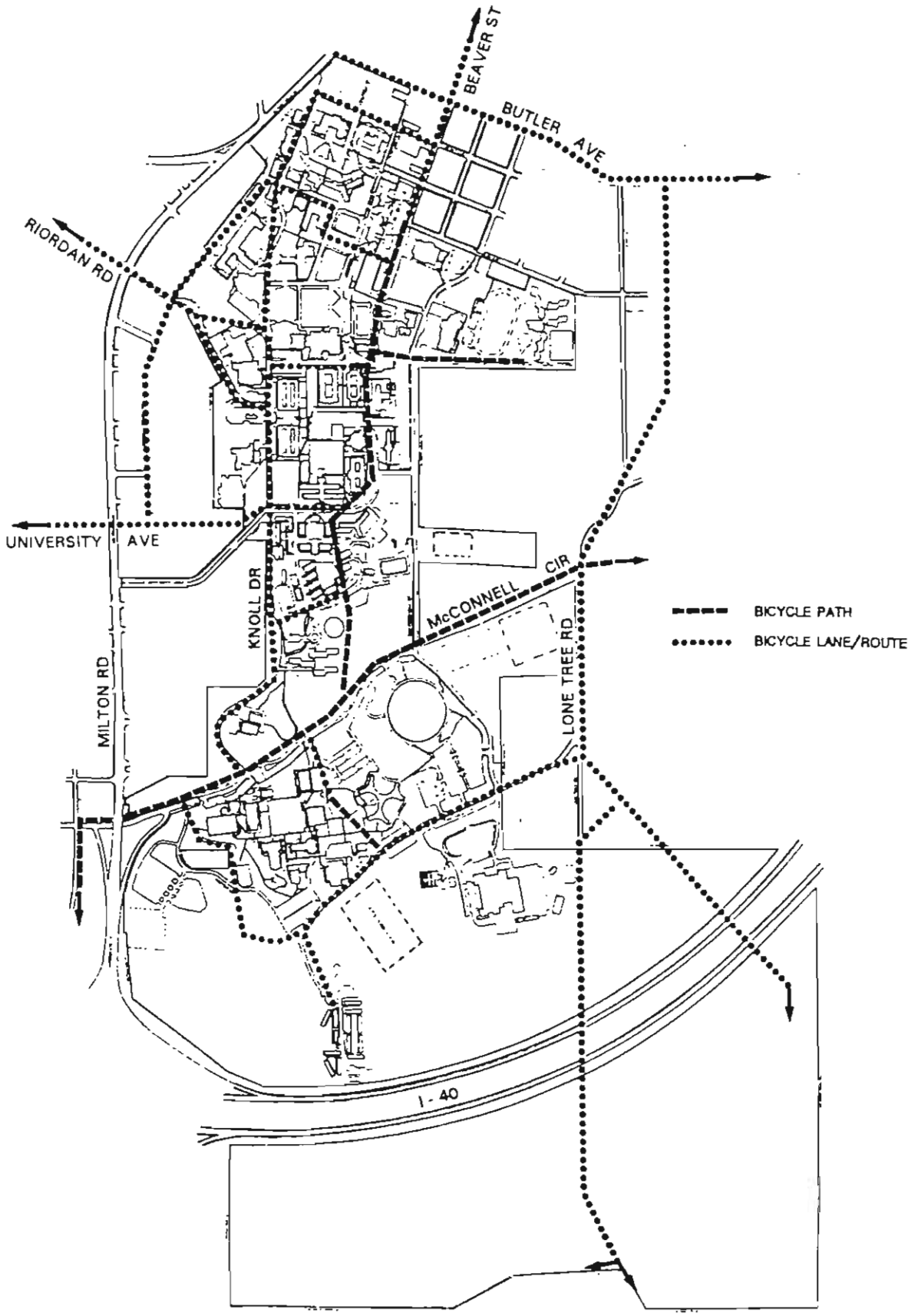
0 1/2 mile 1 mile

CITY OF FLAGSTAFF
PLANNING DIVISION

SEPT 1991


MT ELDEN TRAILS
U. S. F. S.
LOCKETT VALLEY 93-94
CRESCENT TOO CUESHIRE 93-94
OBSERVATORY MESA
BUFFALO PARK
CRESCENT BEALE TO 92-93
LOWELL/ OBSERVATORY MESA
BIRCH TO BEALE
McMILLAN MESA 94-95
RIO DE FLAG CANYON
RIO DE FLAG TO BUTLER 92-93
RIO DE FLAG TO FOXGLEN PARK 95-96
SINCLAIR WASH
BOW & ARROW WASH LK MARY RD 96-97
UNIVERSITY HEIGHTS TO FT TUTHILL 91-92
LK MARY RD TO FT TUTHILL 97-98
FT TUTHILL
*LOCKETT VALLEY TRAILS NOT INCLUDED IN PROPOSED MILEAGE CALCULATION
F.U.T.S. EIGHT YEAR PLAN
COMPLETED/UNDER CONSTRUCTION (budgeted) TRAILS approx. 8 miles
PROPOSED TRAIL(S) approx. 12 miles
(PENDING UPON FUNDING)
CITY OF FLAGSTAFF
PLANNING DIVISION
n.t.s.

PROPOSED BICYCLE CIRCULATION



NORTHERN ARIZONA UNIVERSITY

CAMPUS MASTER PLAN

City of Flagstaff Ad Hoc Bikeways Committee

FLAGSTAFF BICYCLE SURVEY

Dear Flagstaff Resident, **(Non-Bicyclists and Bicyclists)**

In July of 1990 the Flagstaff City Council appointed the Ad Hoc Bikeways Committee to review and recommend revisions to the existing and proposed bicycle path system in Flagstaff. As part of our study we wish to determine the amount and type of bicycle use in Flagstaff as well as citizens' attitudes toward bicycling.

Your input is very important to us! Please help by completing this survey for each person in your household and mailing it by November 24, 1990. Thank you for your cooperation.

Number of people in household: _____

Number of bicycles in working order in household: _____

Ages of household members:
(Please check each box in column under your age for each question.)

	person 1	2	3	4	5	6
	☐	☐	☐	☐	☐	☐

1. **I have ridden a bicycle in Flagstaff in the past year**

YES	☐	☐	☐	☐	☐	☐
NO	☐	☐	☐	☐	☐	☐

2. **If not, the reason I haven't ridden is:** *(check all that apply)*

Don't have one	☐	☐	☐	☐	☐	☐
Needs repair	☐	☐	☐	☐	☐	☐
Age	☐	☐	☐	☐	☐	☐
Physical problems	☐	☐	☐	☐	☐	☐
Too much traffic	☐	☐	☐	☐	☐	☐
Too dangerous	☐	☐	☐	☐	☐	☐
No parking or security	☐	☐	☐	☐	☐	☐
Other *(please describe)*	☐	☐	☐	☐	☐	☐

3. **I feel there is a need for more bike paths and bike lanes to separate car/bike traffic**

YES	☐	☐	☐	☐	☐	☐
NO	☐	☐	☐	☐	☐	☐

4. **I think the 4 most needed improvements in the present system are:**
(Check 4 only)

Develop a continuous system of bike paths	☐	☐	☐	☐	☐	☐
Improve signs and street markings to designate bike routes	☐	☐	☐	☐	☐	☐
Improve bikeway and street surfaces	☐	☐	☐	☐	☐	☐
Keep the street and bikeways swept	☐	☐	☐	☐	☐	☐
Educate motorists to be more aware of bicycles	☐	☐	☐	☐	☐	☐
Educate cyclists on traffic laws	☐	☐	☐	☐	☐	☐
Enforce traffic laws for cyclists	☐	☐	☐	☐	☐	☐
Establish a bicycle safety education program	☐	☐	☐	☐	☐	☐
Provide better and more secure bicycle parking	☐	☐	☐	☐	☐	☐

5. **Where in the city are more bike paths and lanes needed?**

NON-BICYCLISTS MAY STOP HERE

(For each person in household check box in appropriate column as on first page)

6. **I do ride a bicycle in Flagstaff for:**
(Check all that apply)

	person 1	2	3	4	5	6
Recreation	☐	☐	☐	☐	☐	☐
Exercise	☐	☐	☐	☐	☐	☐
Transportation to work	☐	☐	☐	☐	☐	☐
Transportation to school	☐	☐	☐	☐	☐	☐
Errands	☐	☐	☐	☐	☐	☐

7. **My average city mileage by bicycle per week is:**
(indicate figure in appropriate column)

8. **My usual city riding takes me through the following areas:**
(Check all that apply and list any other routes)

NAU	☐	☐	☐	☐	☐	☐
4th Street	☐	☐	☐	☐	☐	☐
Downtown	☐	☐	☐	☐	☐	☐
Fort Valley Rd.. (180)	☐	☐	☐	☐	☐	☐
Milton Rd	☐	☐	☐	☐	☐	☐
Cedar Hill	☐	☐	☐	☐	☐	☐
Sante Fe	☐	☐	☐	☐	☐	☐
Beaver Street	☐	☐	☐	☐	☐	☐
89 North	☐	☐	☐	☐	☐	☐
89 ASouth	☐	☐	☐	☐	☐	☐
66 West	☐	☐	☐	☐	☐	☐
Butler Ave	☐	☐	☐	☐	☐	☐
Lake Mary Rd	☐	☐	☐	☐	☐	☐

9. I wear a helmet most or all of the time when riding.	YES ☐	☐	☐	☐	☐	☐
	NO ☐	☐	☐	☐	☐	☐
10. I would like more education on bike safety.	YES ☐	☐	☐	☐	☐	☐
	NO ☐	☐	☐	☐	☐	☐
11. I have been in an accident involving injury while riding a bike in Flagstaff in the last 3 years.	YES ☐	☐	☐	☐	☐	☐
	NO ☐	☐	☐	☐	☐	☐

(If answer is yes, please give details and location below.)

Please add your comments or suggestions about bicycle issues in Flagstaff
(Attach separate sheet of paper if necessary)

Figure B-2: Survey Returns by Area.
Flagstaff, AZ Bicycle Survey, Fall 1990.

Area	Number Sent	Number Delivered by Post Office	Number Returned and Analyzed	Percent Returned
Sunnyside	100	99	21	21
Upper Greenlaw	75	75	28	37
University Hts	75	74	37	50
Flag Townsite	75	75	41	55
Swiss Manor	75	75	34	45
Pine Knoll Brannen Homes	100	95	21	22
Total	500	** 493	182	37

** Note: Seven of the 500 surveys were not deliverable and were "returned to sender".

Figure B-3: SUMMARY of Flagstaff, Arizona's Bicycle Survey, Fall 1990.

	Total Reply	% Reply	YES	% YES	NO	% NO
Survey Area	ALL 6					
Number of Households	182	36.9				
Number of People	527					
Number of Bikes	382					
Average Age	31.2	93.4				
Q1. Ridden Bike in Past Year?	495	93.9	303	61.2	192	38.8
Q2. Reason1:Don't Have One	117	61.6				
Q2. Reason2:Needs Repair	15	7.9				
Q2. Reason3:Age	40	21.1				
Q2. Reason4:Physical Problems	21	11.1				
Q2. Reason5:Too Much Traffic	28	14.7				
Q2. Reason6:Too Dangerous	36	18.9				
Q2. Reason7:No Bike Parking	10	5.3				
Q2. Reason8:Other	20	10.5				
Q3. Do We Need More Paths?	453	86.0	432	95.4	21	4.6
Q4. Improv1:Continuous System	335	77.9				
Q4. Improv2:Bikeway Signs	172	40.0				
Q4. Improv3:Better Surfaces	237	55.1				
Q4. Improv4:Keep Surf's Swept	164	38.1				
Q4. Improv5:Educate Motorists	145	33.7				
Q4. Improv6:Educate Bicyclist	221	51.4				
Q4. Improv7:Enforce CycleLaws	205	47.7				
Q4. Improv8:BikeSafetyProgram	134	31.2				
Q4. Improv9:More Bike Parking	102	23.7				
Q5. Where Need More Paths?			see	Fig.	B-8	
Q5. Where Need, Cont'd.						
Q6. WhyRide1:Recreation	278	91.4				
Q6. WhyRide2:Exercise	216	71.1				
Q6. WhyRide3:Transport'n Work	64	21.1				
Q6. WhyRide4:Transport School	73	24.0				
Q6. WhyRide5:Errands	102	33.6				
Q7. Average # Miles per Week	12.6m	43.1	Min	.5mi	Max	75mi
Q8. WhereRide1: NAU	98	44.3				
Q8. WhereRide2: 4th Street	78	35.3				
Q8. WhereRide3: Downtown	112	50.7				
Q8. WhereRide4: Hwy 180	33	14.9				
Q8. WhereRide5: Milton Rd.	59	26.7				
Q8. WhereRide6: Cedar	83	37.6				
Q8. WhereRide7: Santa Fe Ave.	97	43.9				
Q8. WhereRide8: Beaver Street	92	41.6				
Q8. WhereRide9: Hwy 89 North	16	7.2				
Q8. WhereRide10: Hwy 89 South	41	18.6				
Q8. WhereRide11: Hwy 66 West	26	11.8				
Q8. WhereRide12: Butler Ave.	58	26.2				
Q8. WhereRide13: Lake Mary Rd	58	26.2				
Q9. Usually Wear a Helmet?	305	57.9	98	32.1	207	67.9
Q10. Want Safety Education?	282	53.5	176	62.4	106	37.6
Q11. Had an Injury past 3yrs?	316	60.0	19	6.0	297	94.0

Figure B-4: Bicycle Usage by Age
in the Flagstaff, AZ Bicycle Survey, Fall 1990:

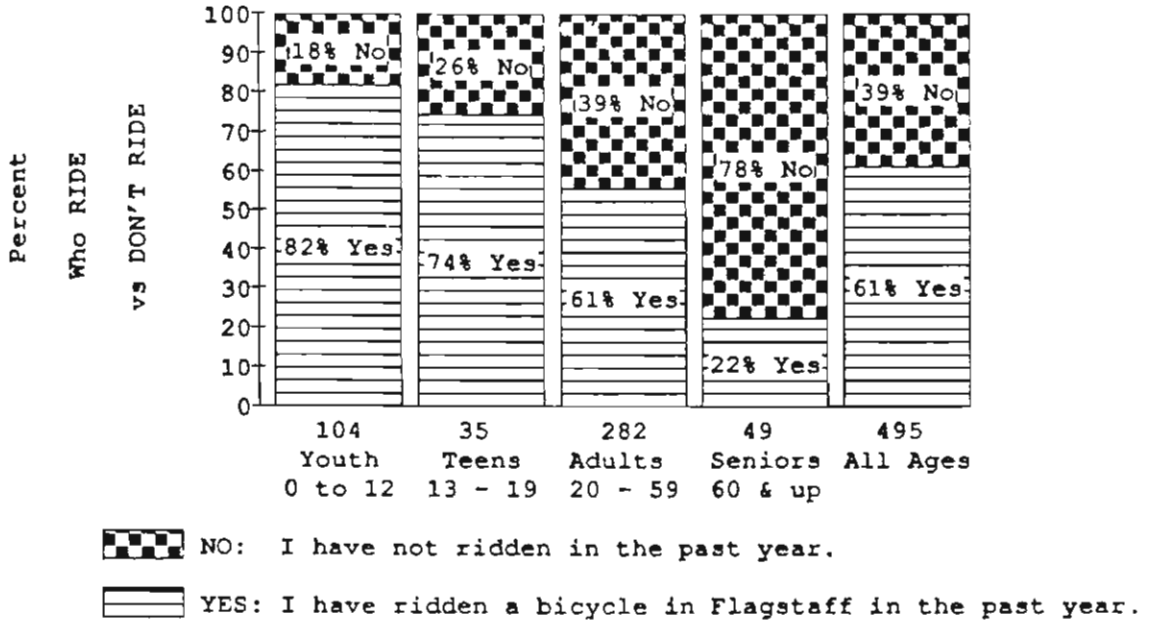


Figure B-4: Whether or not people ride bicycles, as a function of age.

	# Yes	# No	% Yes	% No
Youth (0 to 12)	85	19	82	18
Teen (13 to 19)	26	9	74	26
Adult (20 to 59)	173	109	61	39
Senior (60 & up)	11	38	22	78
Age Unknown	8	17		
ALL AGES	303	192	61	39

QUESTION 1: "I have ridden a bicycle in Flagstaff in the past year."

Source: Flagstaff Bicycle Survey, Fall 1990.

Figure B-5: Number of Bicyclists per Home in the Flagstaff, AZ Bicycle Survey, Fall 1990.

Number of Bicyclists per home	Number	Percent of Total
No Answer	1	0.5
0	47	25.8
1	45	24.7
2	39	21.4
3	31	17.0
4	11	6.0
5	5	2.7
6	3	1.6
7	0	0.0
Total	182 Homes	100.0

Figure B-6: Peoples opinions on the need for more bike paths and bike lanes in Flagstaff, according to whether they ride bicycles or not.

	Total (448 people)	Bicyclists: (288 people)	Non-Bicyclists: (160 people)
Want More Paths? YES:	95%	98%	91%
Want More Paths? NO:	5%	2%	9%

Source: City of Flagstaff Bicycle Survey, Fall, 1990.
Question 1: "I have ridden a bicycle in the past year." (Yes or No).
Question 3: "I feel there is a need for more bike paths and bike lanes to separate car / bike traffic." (Yes or No).

Figure B-7: What are the 4 most needed improvements in Flagstaff's present bicycle system, according to bicyclists and non-bicyclists.

	Combined (430 people)	Cyclists (268 people)	Non Cyclists (154 people)
Continuous System	78 %	85 %	67 %
Improved Surfaces	55 %	64 %	42 %
Educate Cyclists	51 %	40 %	70 %
Enforce Laws on Bikes	48 %	34 %	70 %
Improve Bikeway Signs	40 %	41 %	39 %
Keep Bikeways Swept	38 %	40 %	36 %
Educate Motorists	34 %	40 %	23 %
Bike Safety Program	31 %	31 %	31 %
Better Bike Parking	24 %	29 %	14 %

Source: Flagstaff Bicycle Survey, Fall 1990.
(527 people in 182 Households responded to this survey. They had 382 bicycles).
QUESTION 4: "I think the 4 most needed improvements in the present system are: (check 4 only)"
QUESTION 1: "I have ridden a bicycle in Flagstaff in the past year." (Question 1 is used here to partition the results of question 4).

NOTE: Eight people who answered Question 4 didn't answer Question 1. Hence the denominator for the combined column is 430, not 268 + 154 = 422.

Figure B-8: QUESTION 5:
Where in the city are more bike paths and lanes needed?

Routes	Number of Responses	% of 116 Homes
Downtown *	44	38
Santa Fe Ave. *	37	32
NAU *	25	22
Milton Road *	24	21
180 North *	14	12
89 South *	13	11
Cedar Hill *	12	10
Butler Ave. *	12	10
Path East to West	12	10
Beaver Street *	10	9
Lake Mary Rd. *	10	9
Elem. Schools	9	8
West Side	8	7
All over	8	7
Major Streets	6	5
Parks	4	3
East Flag	4	3
89 North *	3	3
Rio de Flag	3	3
Shopping Centers	3	3
Univ.Heights	3	3
4th Street *	2	2
66 West *	2	2
Enterprise Rd.	2	2
Southside	2	2
to Nat'l Forests	2	2
Lockett Road	1	1
Sunnyside	1	1

A NOTE on BIAS: Question 5 was a "fill in the blank with your own answer" type of question. Areas not mentioned elsewhere in the survey (and hence not suggested) may be biased low compared to areas mentioned in Question 8 of the survey, flagged here with " * ". (Ten of the top-ranked 11 areas were mentioned elsewhere in the survey, whereas "schools", not suggested, was 12th).

Source: City of Flagstaff Bicycle Survey, Fall 1990.
(Of 182 homes surveyed, 116 responded to this question).

Figure B-9, Showing the uses people have for their bicycles. Results are tabulated by age group, and for all age groups.

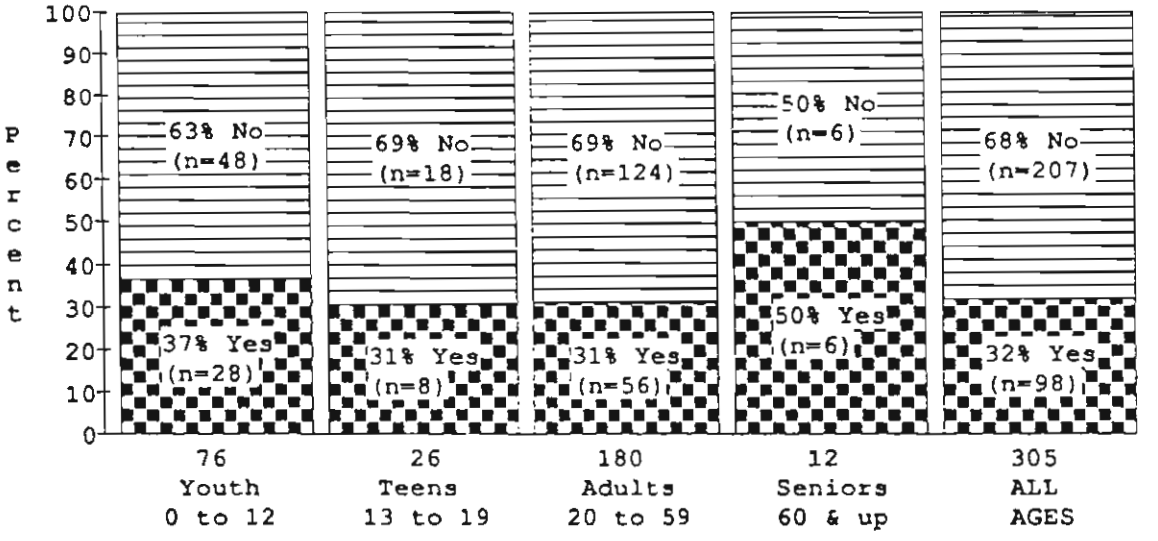
	% All Ages (n=295)	% Youth 0 - 12 (n=82)	% Teen 13 - 19 (n=24)	% Adult 20 - 59 (n=178)	% Senior 60 & up (n=11)
Recreation	91	91	92	91	100
Exercise	71	48	63	82	82
Tranportation to Work	21	2	0	34	18
Transport'n to School	24	34	33	20	0
Errands	34	23	25	40	36

Question 6: "I do ride a bicycle in Flagstaff for: (Check all that apply)."

Notes: 1. Columns don't add up to 100% because one person could check more than one reason to ride a bicycle.
2. Nine people who didn't give their age are included in the all ages" data.

These results are from the Flagstaff Bicycle Survey, Fall 1990,

Figure B-10: Helmet Usage in the Flagstaff, AZ Bicycle Survey, Fall 1990.



QUESTION 9: "I wear a helmet most or all of the time when riding."

Note: Eleven people who didn't give their age are included in the ALL AGES data.

Figure B-10: Helmet Use according to Age.
Flagstaff, AZ Bicycle Survey, Fall 1990.

	Number of People Saying "YES"	Number of People Saying "NO"	% YES	% NO
Youth (0 to 12)	28	48	37	63
Teen (13 to 19)	8	18	31	69
Adult (20 to 59)	56	124	31	69
Senior (60 & up)	6	6	50	50
Age Unknown	0	11		
ALL AGES	98	207	32	68

Figure C-1: Visual Bicycle Traffic Survey, Flagstaff AZ, Fall 1990.

Inter-section	Time	Date	Bikes per Hour	Youth per Hour	Teen per hour	Adult per hour	# Bikes N-S *	# Cars N-S*	% Bikes N-S *	%Vio-la-tions	% Hel mets
Milton/	0730-0830	30-OCT	22	0	3	19				50	14
/Riorden	1200-1300	30-OCT	51	0	0	51				25	10
" "	1655-1755	30-OCT	33	0	1	32				42	9
Beaver/	0730-0830	27-OCT	27	0	1	26	20	306	6.1	26	22
/Santa Fe	1200-1300	27-OCT	74	4	13	57	48	534	8.2	34	20
" "	1630-1730	30-OCT	88	3	0	85	63	442	12.5	56	19
SanFrncisco	0730-0830	30-OCT	31	0	0	31	22	291	7.0	55	6
/Santa Fe	1200-1300	30-OCT	65	0	0	65	51	694	6.8	54	11
" "	1630-1730	30-OCT	81	7	2	72	57	593	8.8	60	12
Enterprise/	no data										
/Santa Fe	1200-1300	30-OCT	15	1	5	9				60	7
" "	no data										
4th / Cedar	0830-0930	27-OCT	2	0	2	0				100	0
& Lockett	1230-1330	27-OCT	10	5	0	5				10	10
" "	no data										
Totals --->	12 hours		499	20	27	452	261	2860			
Percent -->				(4%)	(5%)	(91%)			9.1%	46%	14%

Bicycle data were taken visually by an observer sitting near the intersection.

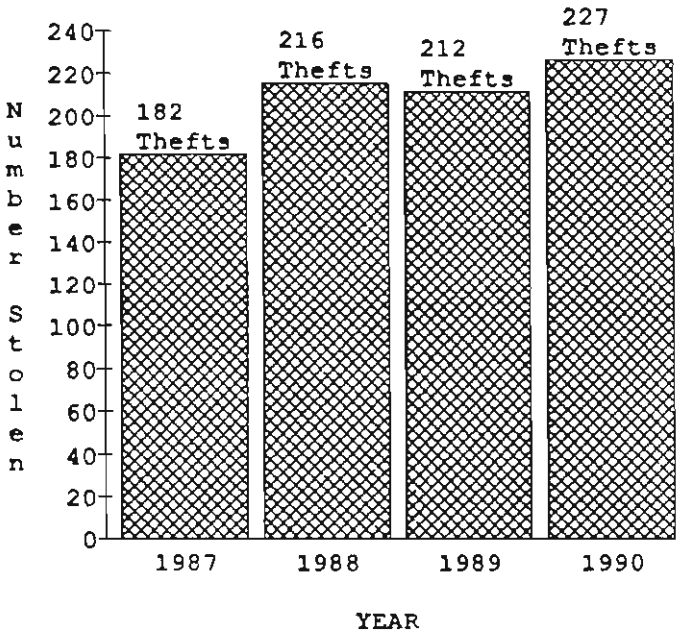
* N-S denotes north - south traffic. Note that for the 3 intersections where N-S automobile data were available from the City Traffic Engineer, over 9% of the total traffic consists of bicycles.

Most violations consisted of either crossing without a green light or riding on the sidewalk. (Except for the Enterprise/Santa Fe intersection, the pushbutton for the WALK signal can only be reached from the sidewalk).

Figure D-1: Car / Bicycle Accidents Reported to the Flagstaff, Arizona Police Department in 1989 and 1990.

Year	Total Accidents	Number of Non Injury Accidents	Number of Injury Accidents	Number of People Injured	Number of People Killed	Minimum Age	Average Age	Maximum Age	Number of Citations
1989	32	7	25	28	1	8	20	32	4
1990	30	7	23	24	0	7	21	46	9

Figure D-2:
Bicycle Thefts Reported to the Flagstaff, AZ Police Department.



7.4 SUMMARY OF COMMENTS FROM SURVEY

Numerous comments were received as part of the city-wide survey of bicycle issues. The overwhelming majority of respondents were supportive of bicycling, in general, with widespread support for an expanded bike route system. Bicyclists, as well as non-bicyclists, expressed concern over safety, education, and enforcement issues. The commentary was wide-ranging but tended to fall into a number of general categories of interest as indicated below. Included is a representative sampling of the comments received. Additional comments are on file with the Planning Division.

A. Enforcement

- Most bicyclists in Flagstaff are either ignorant or purposefully ignore the law. Most of the accidents I have witnessed are cyclists running stop signs and lights or riding on the sidewalk. The law must be enforced and the cyclists educated.

- If I ran a stop sign - I would get a ticket!! They should too!

- Bicyclists should be forced to obey all traffic laws & signs, the same as motorists.

- Right of way - Motorists making right on red disregarding bikers.

B. Promotion, Advocacy, Encouragement

- Print a map of city bike paths (could list laws on reverse) - distribute at schools, tourist stops, youth hostels, Chamber of Commerce. (could also show hiking areas.)

- It's time the City of Flagstaff started pumping money into our city, improving our resources and events to draw in more tourist dollars.

- I think we should promote people to ride their bicycles to work once a week. Flagstaff is so small, this could be very feasible.

- We need a promotion to encourage more biking / less driving.

- Bike lanes / paths should be a high priority for Flagstaff due to energy conservation & the need for exercise. Would also be a great tourist attraction - rent a bike & see Flagstaff! What about BBB monies to help develop?

C. Environmental Concerns

- To provide adequate, convenient and safe bike routes will help to eliminate the traffic problems of Flag along with help conserve gas & pollution and make for a cleaner town!

- Very important! Save gas! Decrease CO2 in the air! Good for health!

- Those who choose to ride bikes are protecting our clean air and should be protected.

- Work commuters need consideration, fuel is expensive and environmentally unsound...

D. Bicycle Facilities

- Bicycle paths are needed all over the major arterials in town, clearly marked and accessible.

- In a university town most everything pertaining to bikes should be up to date and improved. Educate motorists and bike riders should be #1.

- Education to bikers + motorists is needed but money is better spent building + maintaining safe bike paths.

- Please do develop bike routes - in conjunction with your urban trails system you would have a system that is among the best in the country. It would be used + enjoyed. And it would be far safer than mixing cars and bikes.

- Downtown is a serious hazard - both to the biker & the motorist...Shut off downtown streets to traffic...turn those into walking, biking areas...Build a pedestrian & biker bridge across to parking areas on the south side of tracks...the charm of the downtown area would best be rebuilt by getting the cars out of there!

- Cinders are deadly. Bike Paths are preferable to lanes when possible. Safe bike systems will decrease need for expensive roadways, decrease pollution and attract athlete trainers to the high altitude (a potential growth industry).

- We don't need any more. We need fewer.

- When bicyclists begin paying a direct tax for road improvement and maintenance; when they have to buy liability insurance; when they acquire good manners and good sense, then they deserve some considerations. In the meantime let the bastards take their chances. And stop wasting my tax money on them!

E. Safety, Education, Encouragement

- Road bikes are considered communists by drivers. Perhaps NAU bike education would help. Blowing through stop signs, etc.

- Perhaps signs stating that pedestrians and bikers have the right of way would help raise awareness for motorists. But self responsibility is a MUST for the individual - either way!

- A few years ago, I was riding my bike to work nearly everyday, but it has become too dangerous.

- BOTH drivers and bicyclists need to be made more aware of each other. The city should do more to ENCOURAGE bicyclists.

- Major problems include cars parked in bike lanes, temporary (construction) signs in bike lanes, cars driving in bike lanes, and bicyclists weaving around cars stopped at red lights and stop signs.

- A lot of car drivers have some sort of vengeance against bicyclists. ex: dirty looks and comments out of their window.

7.5 DOCUMENTATION ON SURVEY SAMPLE PREPARATION AND METHODOLOGY

During the fall of 1990, the Flagstaff Ad Hoc Bikeways Committee constructed a survey instrument to measure current attitudes of the city residents towards bicycle use within the community. A representative sample of a cross-section of the community was desired to give a measure of validity to the findings from the survey.

The method chosen utilized a cluster survey by like attributes and then applied a simple random sample within the identified clusters. The basic unit of analysis for the clusters were neighborhoods as delineated by the City of Flagstaff Planning Division neighborhood map and by historical convention. These neighborhoods were further identified by economic variation and geographic dispersement.

An economic profile of Flagstaff was provided by the Lane Kendig Economic Base Study Report, the Arizona Department of Commerce - Flagstaff Community Profile, and several marketing documents produced by local real estate companies. It was determined that household incomes in Flagstaff are basically spread evenly through low, medium, and high income categories, and this correlates to assessed valuations of homes in various neighborhoods in approximate numbers. Neighborhoods throughout the city were identified as high assessed value (100K+), medium assessed value ($60K-$100K), and low assessed value (< $60K).

A geographical dispersion of sample neighborhoods was identified through the City Neighborhood Map. High, medium and low assessed valuation neighborhoods were chosen in both the east and west sides of town. A simple random sample was chosen from each neighborhood.

East

High	Swiss Manor
Medium	Upper Greenlaw
Low	Sunnyside

West

High	University Heights
Medium	Townsite (west of downtown)
Low	Pine Knoll/Brannen Homes

Although economic and geographic criteria was utilized as the base factor in determining survey representativeness, numerous other demographic indicators are known through national surveys to influence bicycle use and behavior. Age, gender, education level, ethnic background, and marital status have been shown to have a direct influence on bicycle use and attitudes. For Flagstaff, some of these indicators may have an atypical result, such as with the relationship between education and income. However, selection of sample neighborhoods was based on the intent for providing an accurate representation of the diversity found in Flagstaff.

Additional background information is on file with the City of Flagstaff Planning Division.

8.0 RESOURCES

8.1 References

8.2 Organizations

8.3 Acknowledgements

8.4 Definitions

8.1 REFERENCES

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8.2 ORGANIZATIONS

Arizona Bicycle Task Force
800 W. Washington Suite 415
Phoenix, AZ 85007

advises Governor, ADOT, State Parks, and local jurisdictions on bicycle standards and planning

Bicycle Federation of America
Bicycle Institute of America
1818 R Street N.W.
Washington, D.C. 20009

national lobbying group and clearinghouse for bicycling policy. industry, clubs, individuals and government representatives join to promote bicycling

Bikecentennial
Bicycle Forum
PO Box 8308
Missoula, MT 59807

membership group develops routes, advocates touring technical and policy journal for bicycle professionals

Institute for Transportation and Development Policy
PO Box 56538
Washington, D.C. 20011

non profit group promotes sustainable transportation, especially in Third World

International Mountain Bicycling Association
Route 2 Box 303
Bishop, CA 93514

membership group advocates off-road access for cyclists, promotes responsible off-road riding

League of American Wheelman
6707 Whitestone Road, Suite 209
Baltimore, MD 21207

oldest national organization, lobbies for cyclists' rights, produces educational material and conferences

Mobility Resources
PO Box 381
Santa Fe, NM 87504

produces and promotes bicycle utility trailers as a sustainable transportation alternative

National Off-Road Bicycle Association
1750 E. Boulder St.
Colorado Springs, CO 80909

plans and governs off-road racing in U.S.

Rails-to-Trails Conservancy
1400 16th St. NW
Washington, D.C. 20036

membership group assists in converting abandoned railroads to multi-purpose trails

U.S. Cycling Federation (USCF)
1750 E. Boulder St.
Colorado Springs, CO 80909

governs amateur racing in U.S.

8.3 ACKNOWLEDGEMENTS

The City of Flagstaff Ad Hoc Bikeways Committee would like to thank all the people who offered their assistance, participation, input and support in the production of this report. Thanks also to the 527 people who participated in the Bicycle Survey.

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Coconino County Department of Public Health

Holly Speckles
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Concerned Bicyclist

Jerry Stabley
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Keith Walzak
City of Tucson, Alternate Modes Coordinator

Richard Clewis
City of Phoenix, Transportation Planner

Eric Prosnier
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Aaron Holck
Northern Arizona University, Parking Services Administrator

The Downtown Area Plan Review Committee

Nore Winter
Downtown Master Plan Consultant

Paul Brinkmann
Chamber of Commerce Sports Committee

Mark Erickson
NAU Bike Club

Karan Peasley Robins
Flagstaff Medical Center

Dr. John Caskey
Flagstaff Medical Center

Absolute Bikes

Cosmic Cycles Bike Shop

Flagstaff Schwinn Bike Shop

Loose Spoke Bike Shop

Mountain Sports

8.4 DEFINITIONS

AASHTO - American Association of State Highway and Transportation Officials.

ABTF - Governor's Arizona Bicycle Task Force. Advises ADOT and State Parks on bicycle issues.

ADOT - Arizona Department of Transportation.

Bicycle Facilities - A general term denoting improvements to accommodate bicycling, including parking facilities, signage, all bikeways and routes.

(Type III) - see: Shared Roadway.

Bicycle Lane (Type II) - A portion of a roadway or shoulder which has been designated for use by bicyclists. It is distinguished from the portion of the roadway for motor vehicle travel by a paint stripe, curb or other similar device.

Bicycle Path (Type I) - A separate trail or path from which motor vehicles are prohibited and which is for the exclusive use of bicycles or the shared use of bicycles and pedestrians. Where such trail or path forms a part of a highway, it is separated from the roadway, and from vehicular traffic, by an open space, grade separation, or barrier.

Bicycle Route - A system of bikeways designated by appropriate route markers and by the jurisdiction having authority.

Bikeway - Any road, street, path, or way which in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

BMX - Bicycle motocross is a sport for young riders racing on short dirt tracks, using sturdy single speed bicycles

Cross bike - Also known as "hybrid" bike, a bicycle that contains the best features of rocontingent on the realignment of University Drive and the continuation of Beulah Boulevard. On-street bike lanes should be included on these streets. If Beulah Blvd. is not continued, an off-street path should be installed between Forest Meadows Avenue anrol Devices is the City of Flagstaff's adopted system of standards for traffic control devices.

FUTS - Flagstaff Urban Trails System (pronounced "foots"). Off-road non-motorized city-wide trails system now being developed primarily in greenbelt and open space corridors.

Multiple Use Trail - A trail that permits more than one user group at a time.

Multi-modal transportation - Refers to trip events where individual incorporates more than one mode of transportation, i.e. public transit, private automobile, walking, bicycling.

Peak Hour - refers to that hour of the day when the highest volumes of traffic occur on a transportation facility, for that day.

Pedestrian - A person whose mode of transportation is on foot, including walking a bicycle, or person using a wheelchair or similar device.

Right-of-Way - A general term denoting land, property, or interest therein, for transportation purposes, but with other associated uses such as utilities, water and sewer lines, or buffer zones.

Road bike - Designed for paved surfaces. usually with dropped handlebars, multi-speeds and "skinny" tires.

Rumble-Strip - A linear strip at the edge of pavement or separating travel lanes consisting of indentations formed perpendicular to the road surface, usually when the asphalt is still hot, approximately 7/8 inch in depth, eight inches on center, one to two feet wide.

Shared Roadway (Type III) - A roadway which is officially designated and marked as a bicycle route, but which is open to motor vehicle travel and upon which no bicycle lane is designated.

Sight Distance - A measurement of the bicyclist's visibility, unobstructed by traffic, landscape, or buildings, along the normal travel path to the furthest point of the roadway surface.

Single Track Trail - a trail only wide enough for one user to ride.

Street Types:

Arterial - Designed primarily to move traffic into and through City. Access to abutting properties is discouraged.

Collector - Conducts traffic between local and arterial streets, or to local traffic generators such as shopping centers, schools, etc. Land access should be secondary.

Local - Provides access to individual properties. Through traffic discouraged.

Traffic Control Devices - Signs, signals, or other fixtures, whether permanent or temporary, placed on or adjacent to a travelway by authority of a public body having jurisdiction to regulate, warn, or guide traffic.

Triathlon - A three-sport event featuring swimming, running, and bicycling.

Transit - Mass transportation, such as public buses.

Utilitarian Bicyclist - An individual who uses a bicycle to reach a particular destination. May include bicycles adapted to carry cargo for a particular purpose.

Velodrome - A bicycle racing track with banked turns.

Wide Curb Lane - A portion of the roadway designated for shared use by bicycles and motorized traffic. Width of lane is typically 12 to 15 feet.